The Dissertation Committee for Lauren Therese Melendres certifies that this is the approved version of the following dissertation:

Dispositional Factors Related to Choking Under Pressure in Sport

Committee:

Chris McCarthy, Supervisor

John Bartholomew

David Drum

Kevin Stark

Tiffany Whittaker

Dispositional Factors Related to Choking Under Pressure in Sport

by

Lauren Therese Melendres, B.A.; M.A.

Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

August 2011

Dedication

This dissertation is dedicated to all of those individuals who have the heart, drive, and skills, but just let pressure get the better of them!

Acknowledgements

Undertaking this dissertation has been an arduous experience, but my academic and personal growth throughout the process has been gratifying. Despite the moments of isolation throughout this project, the successful completion of my dissertation is not my accomplishment alone, but rather shared by a community of friends, colleagues, and family. As such, I would like to extend my deepest gratitude to each and every person who supported me along this academic journey; without you, achieving this academic milestone would not have been possible.

First and foremost, I would like to thank all of the individuals who participated in this study. Without your interest, effort, and time, this project would never have materialized. In the same vein, the recruitment of participants would not have been possible without the tremendous help from a few key individuals. Dr. Randa Ryan, I am indebted to you. Your warmth, support and incredible work throughout this project was unparalleled and allowed me to pursue personally meaningful research. In addition, it goes without saying that I extend my deepest thanks to Coach Whitlinger, Coach Dunning, and Coach Amerkhanian of Stanford University. Without your tremendous help, I would not have been able to finish my data collection in a timely fashion. Coach Whit, it feels complete that my dissertation included the Stanford Men's Tennis Team, as the seeds for this project were planted almost eight years ago when I worked on my Masters' thesis at Stanford with the participation of your team at that time, too. Coach Dunning, thank you for your input and encouragement with my research; it would be a pleasure to work with a coach like you and a team like yours. And Coach Amerkhanian, thank you for your spirit in rallying so many rowing members to participate.

Additionally, the completion of data collection would not have been possible without the assistance from Dr. Ivana Steigman and Emily Risinger.

Second, I would like to thank my dissertation committee chair and committee. Dr. Chris McCarthy, thank you for your consistent support throughout my doctoral career. When we first met, I spoke with you about my deep interest in pursuing research that incorporated sport and counseling psychology. You assured me then that it was possible to pursue my research with you and in your lab group. Thank you for allowing me to follow my research interests, and encouraging me along the way. Dr. David Drum, it meant a great deal to me to have you on my committee; your guidance, wisdom, and support helped me at many points during my dissertation, and doctoral program in general. Dr. John Bartholomew, thank you for serving on my committee and helping me articulate what I was truly after with my research. It was immensely helpful to have someone with your background and interest on my committee, and our discussions concerning my dissertation helped shape the direction it took. Dr. Tiffany Whittaker, your smile, encouragement, and teaching-style made correlational and regression analysis my friend; thank you for your approach. Finally, Dr. Kevin Stark, thank you for your willingness to sit on my committee without prior relationship, and for your expert knowledge and challenging insights.

Third, I would like to express my deep gratitude to my fabulous cohort and colleagues. In particular, I would be remiss to not acknowledge Kim Tran, Pittman McGehee, Stephanie Rooney, Becca North, Sarah Collins, Sara Gilbert, Monique Shah, Tracy Carver and Vanessa Scaringi. Your support, advice, interest and patience was integral to completing this project. Sara Villarreal, you were a true partner, confidante, and good friend on this journey which I will always remember and treasure.

Fourth, if it were not for my dear friends offering unending support in both times of achievement and frustration, I am not sure where I would be. Thank you to everyone! Specifically, I must mention the following: Alarice, thank you for your love, words of wisdom, and encouragement all the way; Bree, without your humor, extreme generosity, and smart advice, I literally would not be where I am; Leslie, your incredible support, patience, and love kept me afloat more than you will ever know, you are dear to me.

Finally, I would like to extend my deepest appreciation to my family. Your unyielding love, support, patience, humor, and sacrifice made all of this possible. Without you, my dream of earning a Ph.D. would not have been imaginable. Mom and Dad, there are no words to convey the level of affection and gratitude I feel for you. Thank you for instilling in me the importance of academic excellence from a young age and nurturing my development in every possible way. In addition, thank you for exposing me to the world of sports at a young age; I can still hear your cheers from the side of the tennis court when I played many years ago. James, you set the bar very high. I am blessed to have such an amazing and supportive brother. Lastly, I must thank my husband from the depths of my heart for your unwavering faith, love, and support. Matt, you have been with me every step of this process, literally and figuratively. Your intelligence, intuition, and encouragement kept me grounded and motivated, and largely contributed to my ability to complete my dissertation. Your sacrifices taught me more about love and a marital partnership than I thought possible. I love you all so much and thank you for everything!

Dispositional Factors Related to Choking Under Pressure in Sport

Lauren Therese Melendres, Ph.D.

The University of Texas at Austin, 2011

Supervisor: Christopher McCarthy

The purpose of this study was to determine whether or not significant relationships existed between dispositional factors (self-consciousness, anxiety, approach coping style) predictive of choking under pressure in competition with factors associated with healthy psychological functioning (dispositional mindfulness and dimensions of psychological well-being). Choking under pressure has been identified as a factor that not only negatively impacts an athlete's level of success in competition, but also the athlete's psychological well-being. Despite these negative effects, minimal interventions exist to address choking under pressure. Mindfulness is a construct that has received attention for its positive effect in the lives of individuals, both in daily living and symptom-relief for a host of issues. As such, the relationships between factors associated with choking-susceptibility, mindfulness, and psychological well-being were examined in the current study to determine if the development of a mindfulness intervention for athletes identified as "choking-susceptible" is appropriate.

The sample for this study included 95 Division I athletes from large Southwestern and Western universities. The data were analyzed using univariate and multiple linear regressions and correlational analysis. The findings of this study revealed significant negative relationships between two out of the three dispositional choking-susceptibility factors (self-consciousness and anxiety), mindfulness, and psychological well-being.

Given the significance of these findings, the development and evaluation of a mindfulness-based choking intervention is warranted.

Table of Contents

List of Tables

List of Figures

CHAPTER ONE: INTRODUCTION

Sport is no longer a mere physical expression or game—it is a well-established institution, pervading all societies at all levels. It has been woven into the fabric of nationalism, entertainment, patriotism, and culture. In the United States alone, it has been estimated that 96.3% of the population engages in athletic events, as a participant or fan, more than once a month (Stainback, Moncier, & Taylor, 2007). Individuals invest a significant amount of time, interest, and money in sports, and its influence is expected to only grow in the future.

The effects of this intense interest in sports are seen on both a macro- and micro-level. On the macro-level, the performance of a team can influence the image of a country in the world's eyes. For example, in July 2007 Iraq beat Saudi Arabia to clinch its first Asian Cup Soccer Championship. Iraqis viewed this victory as a demonstration to the world of the real Iraq which could work together and accomplish great things, and as a result boosted the mood and nationalism in the war-torn country (Juhi, 2007). Although sports performance does have an effect at the macro-level, it is more commonly seen affecting the micro-, or individual-level. The strong performance of an individual can result in scholarships, endorsements, and national glorification, whereas a poor performance may have career-ending results. In addition to the external ramifications of performance in sports, there is an effect on the individual's cognitive and emotional processes that inform performance quality and psychological well-being.

The high levels of pressure and demand on an athlete at times can produce outstanding performance; however, they can also result in a failed performance. Poor performance in response to what an individual perceives as an important and pressure-

filled situation has been termed choking[1] (Beilock & Gray, 2007). Choking is considered a particularly damaging label to an athlete's psychological state and well-being (Goorjian, 2002; Gucciardi, Longbottom, Jackson, & Dimmock, 2010; Mesagno, 2006; Wang, Callahan, & Goldfine, 2003). Therefore, psychologists of different disciplines, including social, sport, clinical, and counseling, have produced research over the past thirty years attempting to answer basic questions concerning choking. What constitutes choking? In what situations does choking occur? Who chokes? This line of inquiry has produced interesting results and incited even more questions.

A strong foundation has been established regarding the basics of choking, and more recently, the mechanisms underlying choking; however, there remains much to be learned about this complex phenomenon. Due to the complexity of the construct and ongoing debates concerning the underlying mechanisms of choking[2], it has been challenging for researchers to design effective treatments for athletes who experience choking (Mesagno, 2009). Therefore, it is imperative to continue to research factors associated with choking and their connection with other constructs which can potentially inform the development of effective treatments.

One psychological construct, mindfulness, has received a great deal of attention in the psychological and medical literature for its positive role in the effective treatment of issues ranging from depression and anxiety disorders to chronic pain, addictions (drugs, smoking, alcohol), stress, post-traumatic stress disorder, and more (Bishop, Lau, Shapiro,

[1] Mesagno (2006) highlighted in his research the redundant nature of referring to "choking under pressure" when discussing this phenomenon in the sports context, as choking is limited to high-pressure situations. Therefore, throughout this dissertation, I have followed his practice to refer to "choking under pressure" simply as choking.

[2] There remains a healthy debate in the choking literature to the present time as to which model (self-focus or distraction) best describes the phenomenon. Baumeister and Showers (1986) noted that interventions "ameliorating choking must wait until this debate is resolved" (p.377). To date, relatively few interventions exist.

Carlson, Anderson, & Carmody, 2004; Martin, 1997). In addition, dispositional mindfulness has been associated with lower levels of psychological distress, and the overall promotion of psychological well-being and functioning (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Coffey & Hartman, 2008; Masicampo & Baumeister, 2007). Further, in sport literature, mindfulness has recently been implicated as a construct related to athletes' ability to experience "flow," otherwise referred to as peak performance (the opposite of choking) (Kee & Wang, 2007; Jackson & Csikszentmihalyi, 1999; Nideffer, 1992). For these reasons, one goal of this dissertation is to empirically examine if a similar, albeit negative, relationship exists between mindfulness and factors related to choking.

The other construct of interest in this dissertation is psychological well-being. By definition, psychological well-being is an integral component to human functioning as it represents the individual's ability to experience and live functionally (Ryan & Deci, 2001). As a result of its centrality to healthy human functioning, it is logical to extend our understanding of its relationship to other constructs like mindfulness and choking. And indeed, separate theoretical and empirical efforts have been made to understand the relationship between mindfulness and psychological well-being (Carmody & Baer, 2008; Ryan & Brown, 2003), as well as between choking and psychological well-being (Goorjian, 2002; Gucciardi et al., 2010; Mesagno, 2006; Wang et al., 2003). Thus, the end goal of this dissertation is to enhance our current understanding of these constructs and their relationships with each other in order to inform the development of effective interventions for athletes identified (self- or otherwise) as possessing traits that make them more susceptible to choking.

This dissertation is especially relevant because research has found that some characteristics of the sport environment, including performance pressure, place athletes at

more risk than the general population for developing anxiety and stress, depressive disorders, eating disorders, and substance-related disorders (Hays, 1999), and this is particularly true for athletes performing at an elite level (Pipe, 2001). An athlete's propensity to develop mental health disorders as a result of their environment highlights the importance of further understanding the deleterious effects of sport and developing interventions to deal with performance pressures that may safeguard athletes from some of these negative effects.

CHAPTER TWO: LITERATURE REVIEW

The purpose of the following literature review is to examine the basis for exploring variables identified as increasing athletes' susceptibility to experience choking, mindfulness, and factors comprising psychological well-being in this dissertation. Although aspects of choking have been investigated extensively in the literature, much debate still exists regarding choking models and variables involved in this complex construct; as a result, limited interventions exist to combat this debilitating effect of performance pressure that individuals' experience. It is important to expand upon the current theoretical foundation of choking and examine other variables that may be related to the construct to gain a more comprehensive understanding of choking and related variables. As researchers' knowledge increases regarding the choking construct and its relationships with other variables, the closer researchers will be to developing more efficacious interventions.

In the literature review, the construct of choking will be introduced, defined, and discussed in terms of its place in performance anxiety literature in the first three sections. This will be followed by a section addressing the neurobiological markers of choking. Next, the mechanisms underlying choking will be examined with particular emphasis on the attentional models of choking. The following section will provide an analysis of both the dispositional characteristics and situational factors that lead an athlete to be more choking-susceptible. Then, the mindfulness construct will be reviewed in terms of overall significance in the psychology literature, mechanisms underlying mindfulness, dispositional mindfulness, and mindfulness in sport. The last construct to be discussed in the literature review will be psychological well-being. Similar to mindfulness, psychological well-being will be reviewed in terms of overall significance in the

psychology literature, psychological well-being in sport, and psychological well-being and mindfulness. Lastly, the chapter will conclude with a summary.

INTRODUCTION TO CHOKING

> Many acts are most successfully carried out when they are not the object of particularly concentrated attention…mistakes may occur just on (those) occasions when one is most eager to be accurate (Freud, 1922, p.23).

A little less than a century ago in his *Introductory Lectures on Psychoanalysis*, Freud captured the paradoxical phenomenon of a person's struggle to perform at those times most crucial to them. Researchers have come to refer to this psychological phenomenon as choking. Choking refers to a break down—mostly sudden—of a skilled and even expert performance, attributed, it is thought, to "pressure circumstances" (Baumeister, 1984). It is a common phenomenon witnessed in all domains, including sports, where pressure and stress are generated by the demands of performance. Players, coaches, and media offer 'choking under pressure' as an explanation for a loss that occurs after a substantial lead or the inability of a player or team to capitalize on important plays or points. It is not difficult to recall athletes that are labeled chokers: for example, golf professional Greg Norman had a reputation for losing when winning seemed inevitable as in the 1996 Masters Tournament (one of the four major golf championships) where his 6-shot lead into the final round became an 11-shot deficit between his final score and the winner's score; and tennis professional, Jana Novotna, who famously cried on the Dutchess of Kent's shoulder after losing the 1993 Wimbledon's Women's Final to Steffi Graf after possessing a commanding 4-1 lead in the third and final set.

CHOKING DEFINITION

Choking is one type of performance deficit (listed as the 4th defining feature of performance anxiety), and the focus of this dissertation within a sports context. The most widely accepted definition for choking is performing more poorly than expected given one's skill level which is thought to occur across diverse task domains where incentives for optimal performance are at a maximum (Beilock & Carr, 2001; Lewis & Linder, 1997; Masters, 1992). Paradoxically, choking frequently "results from aspirations to function at one's best, [however,] pressure-packed situations are where suboptimal skill execution may be most visible" (Beilock, 2007, p.140).

CHOKING CONCEPTUALIZATION

Choking exists within the larger framework of performance anxiety. Performance anxiety is best understood as a set of experiences in which a person responds anxiously in the context of a performance-based setting or the anticipation of a performance. Generally, this experience includes the potential negative evaluation as a result of performance (Hopko, Hunt, & Armento, 2005). Although performance anxiety as a psychological construct has been described in the literature for over a half-century (e.g., Mandler & Sarason, 1952), this term does not appear in the *Diagnostic and Statistical Manual for Mental Disorders, 4th ed.* (American Psychiatric Association, 1994). At this point, performance anxiety is generally discussed clinically in conjunction with social phobia or social anxiety disorder. Best estimations from researchers in the field infer that about 2% of the population is vulnerable to one or another form of debilitating performance anxiety (Powell, 2004). In terms of sport performance, approximately 68% of athlete-clients initially seek treatment from psychologists (sport or clinical/counseling) to overcome performance issues, including performance anxiety, in an effort to enhance

performance and healthy psychological functioning (Leffingwell, Wiechman, Smith, Smoll, and Christensen, 2001).

The catalyst for performance anxiety is performance pressure. Performance pressure is experienced when there is desire to perform to the best of one's abilities in situations with a high degree of personally-felt importance (Baumeister, 1984; Hardy, Mullen, & Jones, 1996). There are different types of performance anxiety, including test, sports, music, public-speaking, social, and sexual performance. These types of anxieties have been reported in nearly every developed country in the world (Powell, 2004). The defining features of performance anxieties are: 1) physiological hyperarousal which is elicited in the performance-based contexts; 2) negative cognitions (e.g., excessive fear of negative evaluation) that occur prior to, during, and following performance; 3) escape from and/or avoidance of performance-related situations; and 4) performance deficits which may be conceptualized as a function of anxiety-related responding, motivational deficits, and/or associated skill deficits (Hopko, McNeil, Zvolensky, & Eifert, 2001). As previously stated, choking is one type of performance deficit, and the focus of this dissertation within a sports context. In the following section, neurobiological markers of choking are addressed.

NEUROBIOLOGICAL MARKERS OF CHOKING

Studies examining neurobiological markers related to choking are very limited; however, a recent study by Mobbs, Hassabis, Seymour, Marchant, Weiskopf, Dolan, and Frith (2009) investigated just this. Specifically, Mobbs et al. researched the neurobiological basis of choking in humans and found that increased activity in the ventral midbrain and striatum is strongly correlated to performance decrements and near-misses induced by high rewards. Participants in the study underwent functional magnetic resonance imaging (fMRI) while they navigated through a computerized maze and

searched for an "artificial prey" multiple times. Participants were monetarily-incentivized (between $1 -$10) to capture the "artificial prey" prior to starting each maze. Consistent with choking, data revealed that participants were less successful in "capturing" high pay-off prey than in capturing low pay-off prey. In addition, Mobbs et al. found increased activation in regions of the prefrontal cortex, specifically the medial and lateral prefrontal cortex, which were identified as predictors for better performance and reduced susceptibility to incentive-induced errors. The researchers noted that the medical prefrontal cortex may exert an opposing influence over the ventral midbrain in controlling performance (Ridderinkhof, Ullperger, Crone, & Nieuwenhuis 2004 as cited in Mobbs et al., 2009).

Mobbs et al.'s (2009) study was informed by past research conducted by Murphy, Arnsten, Goldman-Rakic, and Roth (1996) in which they investigated whether increased dopamine turnover in the prefrontal cortex (which demonstrates a sensitivity to stress) impairs spatial working memory performance in rats and monkeys. Previous research demonstrated that "the spatial working memory functions of the prefrontal cortex are dependent upon the integrity of the dopamine neurons: experimental depletion of dopamine restricted to the prefrontal cortex can lead to working memory deficits in monkeys and rats" (p. 1325). Murphy et al. hypothesized and found in their study that excessive dopamine activity in the prefrontal cortex is similarly detrimental to the prefrontal cortical cognitive functioning in both rodents and monkeys. Murphy et al. suggested that there may be a critical range of "dopaminergic activity for optimal prefrontal cortex-dependent cognitive functioning and that exceeding this range results in dysregulation and cognitive impairment" (p.1329).

Research exploring neurobiological markers of choking is in its infancy, but Mobbs et al.'s study is indicative of the promising results and knowledge that can be

gleaned into this line of inquiry regarding choking behavior. In the following section, the mechanisms of choking are considered.

MECHANISMS OF CHOKING

A number of theories have been postulated to explain the phenomenon of choking. However, the two predominant theories in the literature explaining choking are the self-focus model and the distraction model which are two types of attentional theories. Attentional theories attempt to describe the cognitive processes that govern pressure-induced performance decrements. Briefly, the self-focus model (also referred to as the explicit monitoring model, as well as the automatic execution model) asserts that performance pressure increases anxiety and self-consciousness about performing correctly, which in turn enhances the attention paid to skill processes and their step-by-step control (Baumeister, 1984; Beilock & Carr 2001; Lewis & Linder, 1997). The distraction model posits that pressure fills working memory with thoughts about the situation and its importance which competes with the attention normally allocated to execution (Beilock & Carr 2001; Lewis & Linder, 1997; Markman, Maddox, & Worthy, 2006; Nideffer, 1992). Thus, interference consumes working memory load and interrupts proceduralized routines (Beilock, 2007). In short, these two theories make opposing predictions about how pressure affects performance; the self-focus model asserts that pressure places an excessive amount of attention on skill execution, whereas the distraction model asserts that pressure detracts from the necessary attention for skill execution (Beilock & Gray, 2007).

Recently, an integrated theory of choking has been proposed by Wang (2002) that combines elements from both of the attentional theory models. Wang's theory suggests that choking may be better understood if both models are incorporated. Wang's theory provides a more unified and comprehensive, albeit complicated, model that considers

several factors contributing to, and involved with, choking. This dissertation endorses the integrated theory of choking, and it will be discussed further below.

Attentional theories wield the most explanatory power for understanding choking because they focus on cognitive representations of skill break-down in pressure situations (Beilock & Gray, 2007). However, it is important to mention that within choking literature, drive theories have also been used to explain choking. Drive models suggest that the degree of performance is determined by an individual's current level of "drive" or arousal (Spence & Spence, 1966). For example, the Yerkes-Dodson (1908) effect, otherwise known as the inverted-U theory, suggests that arousal and performance simultaneously increase, but only up to a certain point, before performance decreases. Therefore, performance is at its peak at intermediate levels of arousal. Although drive theories are consistent with pressure-induced skill decrements in some situations, they are generally limited in usefulness in that they do not provide a mechanistic explanation for why such performance failures occur (Beilock & Gray, 2007). Specifically, the two primary criticisms waged against drive theories is that they do not explicitly state *how* arousal affects performance, and there is much debate concerning the conceptualization of arousal (e.g., physiological construct, emotional construct, or both) (Beilock & Gray, 2007). Therefore, this dissertation, like the vast majority of current choking research, focuses on attentional models.

Overview of Attentional Models of Choking

Researchers (e.g., Baumeister, 1984; Beilock & Carr, 2001; Carver, 1979; Carver & Scheier, 1981; Lewis & Linder, 1997; Markman et al., 2006; Masters, 1992; Nideffer, 1992; Weinberg, 1988) have asserted and empirically supported that choking occurs as a result of attentional problems. Attention is compromised when the demands of a situation exceed a person's attentional capacity. This is based on the premise of Kahneman's

Theory of Attention (1973) in which he theorized that attention is a limited resource. Attention can either be focused on one task or multiple tasks; however, demanding or difficult tasks require more attentional resources and consequently deplete attentional resources for the other tasks (Styles, 1997). Similarly, this applies to situations when attention is focused on task-irrelevant information, thus limiting the attention to task-relevant information. Consequently, when attentional problems arise as a result of attention limitations, a person may suffer performance decrements on one or more tasks (Mesagno, 2006).

The following is a description of the three attentional models and relevant research: *self-focus model*, *distraction model*, and *integrated model of choking*.

Self-focus Model

The self-focus model arose from Fitts, Bahrick, Noble and Briggs' (1961) progression-regression model. This early hypothesis suggested that learning progresses from basic understanding to complex control strategies and that exposure to stress produces a regression to simpler learning levels (Hardy et al., 1996). Initial studies exploring this model were basic, but provided preliminary support. For example, Keele's (1973) research found that performance decrements occurred when piano performers were instructed to focus their attention on their piano playing skills. Langer and Imber (1979) also demonstrated performance degradation when typists were instructed to ensure accuracy by consciously monitoring finger movements.

After these initial studies, Baumeister (1984) proposed that pressure increases the conscious awareness of the performance process which disrupts the automaticity of the skill which results in decreases in performance. He used a table game, where the participant handled two rods that formed a slightly upward inclined track for a metal ball. The task was to move the ball upward by squeezing the two rods toward each other.

Baumeister tested his model through a series of six experiments. The first three experiments revealed a decrement of performance when participants in the experimental group were instructed to pay attention to their hands. The control groups were instructed to pay attention to the ball or given no instructions at all in Experiment 1 and Experiments 2 and 3, respectively. In Experiments 4, 5, and 6, Baumeister demonstrated that competition, reward, and video effectively manipulate pressure. Baumeister (1984) concluded that "situational demands for excellent performance (i.e., pressure) cause the individual to attend consciously to his or her internal process of performance, and consciousness disrupts [the internal] process and disrupts performance" (p. 618).

The next pivotal study exploring the self-focus model was conducted by Masters (1992). He hypothesized that performance decrements occur when a performer attempts to consciously control a skill through explicit knowledge of its mechanics and therefore, the inward focus of attention disrupts the automaticity of the skill. Masters tested his hypothesis by having participants acquire golf-putting skills either explicitly (with knowledge of rules) or implicitly (without knowledge of rules) and perform under pressure (evaluation and financial incentive). Results demonstrated that participants that acquired golf-skills explicitly did not perform as well as participants that acquired golf-skills implicitly under all pressure conditions. Masters concluded that explicit motor learners were less stress-resistant than implicit motor learners because of their focus on the task rules. Recent research has supported Masters' assertion finding that explicit attention to step-by-step skill processes and procedures disrupts well-learned or proceduralized performance processes that normally run largely outside of conscious awareness (Beilock, Bertenthal, McCoy, & Carr, 2004; Gray, 2004; Jackson, Ashford, & Norsworthy, 2006).

Distraction Model

Like the self-focus model, the distraction model proposes that attention is misallocated and thus results in performance degradation. More specifically, pressure influences task performance by creating a distracting environment that compromises one's working memory capacity resources (Beilock & Gray, 2007). Additionally, the distraction model asserts that decreases in performance occur from the failure to focus on task-relevant cues (Carver & Scheier, 1981; Nideffer, 1992; Wang, 2002). In the sports and performance literature, task-relevant cues are factors that are immediately relevant to performance that generally occur in the performer's field of vision like opponent's position and speed; whereas task-irrelevant cues are external distractions (e.g., crowd awareness, focus on scoreboard) and/or internal distractions (e.g., self-doubt, worry, or anxiety) that result in physiological (e.g., increased muscle tension, "butterflies") and attentional changes (e.g., internal focus, narrowed attention) (Beilock & Carr, 2001; Duval & Wicklund, 1972; Nideffer, 1992; Nideffer & Sagal, 1998; Wang, 2002).

Nideffer is a prominent sports psychologist and a major proponent of the distraction model. Nideffer (1992) proposed that athletes choke because their attention shifts from task-relevant to irrelevant factors resulting in distraction. This model is similar to the cognitive-attentional model proposed by Wine (1980) in the test anxiety literature in which poor performance may be due to task-irrelevant (e.g., worry, off-task thoughts) rather than task-relevant (e.g., question on exam) information. Nideffer postulated that as arousal and anxiety increase, the athlete becomes internally immersed in task-irrelevant factors which are reinforced by increasing physiological sensations and inescapable, inappropriate cognitions which result in the failure to attend to task-relevant factors.

In addition to the research supporting the distraction model in motor tasks, it has been the prominent explanation for choking on cognitive tasks (Beilock & Carr, 2001; Beilock et al., 2004; Markman, Maddox, & Worthy, 2006). Researchers hypothesized that pressure creates a dual-task environment in which controlling the task at hand and worries about performance vie for the attentional capacity once devoted solely to primary task performance (Beilock & Carr 2001; Lewis & Linder, 1997). Attentional capacity directly relates to working memory, and therefore research exploring working memory has further supported the distraction model. Beilock and Carr (2005) found that increased pressure intensifies the occurrence of intrusive worries which negatively affect working memory, and consequently performance on cognitive tasks. This reduction in performance was most significant in individuals with the highest working memory capacity. Researchers concluded, "performance pressure harms individuals most qualified to succeed by consuming the working memory capacity that they rely upon for their superior performance" (p. 101).

Integrated Model of Choking in Sport

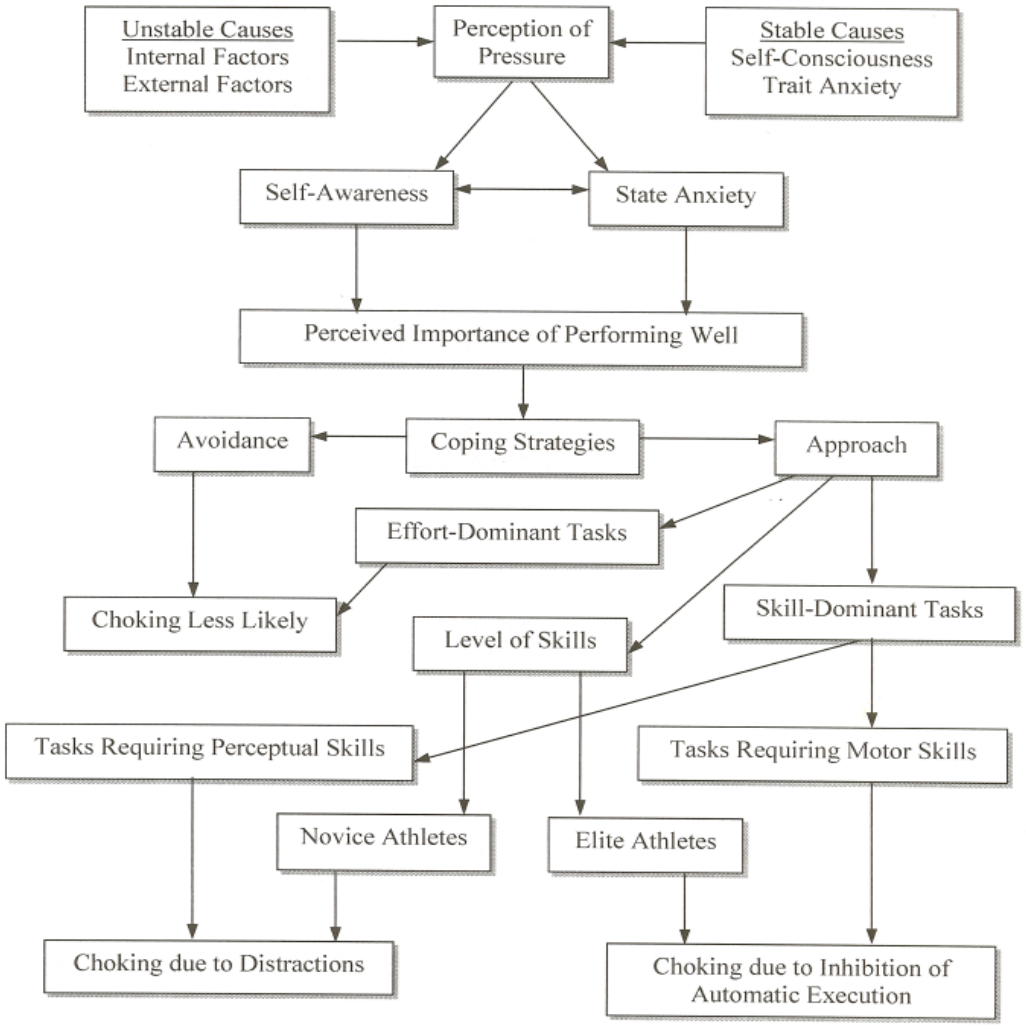
Researchers in the field have debated which of these two predominant models of choking wield the most explanatory power. In the past decade, researchers (Beilock et al., 2002; Beilock et al., 2004; Gray, 2004; Lewis & Linder, 1997) have tested these models against one another in their studies with mixed results. These results have fueled the discussion as to whether or not these models are independent of each other or are overlapping as Baumeister and Showers (1986) suggested. It has been suggested that performance pressure creates two effects that alter how attention is allocated to execution: 1) Pressure induces worries about the situation and its consequences, thereby reducing working memory capacity available for performance, as distraction theories propose; and 2) at the same time, pressure prompts individuals to attempt to control

execution to ensure optimal performance in line with self-focus models, suggesting that how a skill fails is dependent on performance representation and implementation (Beilock & Gray, 2007). In other words, "it populates working memory with worries, *and* it entices the performer to try to pay more attention to step-by-step control, resulting in a double whammy" (Beilock, 2007, p.141). Further, the role of each of these effects in performance is not only largely dependent on the attentional demands of the task being performed, but differentially relevant. For example, tasks that heavily utilize working memory and do not rely much, if at all, on proceduralized routines (e.g., novel math problems) will suffer as a result of "pressure-induced consumption of working memory," and not be negatively affected by the attempt to harness the remaining attention on pressure-induced "step-by-step control" (p.141). In contrast, tasks that heavily utilize proceduralized routines and do not rely much on working memory (e.g., a well-learned tennis serve) will suffer as a result of the "step-by-step control" and much less so as a result of the reduction in working memory capacity (p.141).

The most comprehensive model of choking in sports that incorporates the basic tenets of both the self-focus and distraction models, as well as athlete's skill-level was developed by Wang (2002). The integrated choking process model that Wang (2002) developed, accommodates aspects of the previously discussed models[3], as well as addresses stable personality factors (e.g., self-consciousness and anxiety), coping style (e.g., avoidance or approach), task characteristics (e.g., effort or skill-dominant tasks), and skill-level (e.g., novice or elite).

[3] Wang refers to the self-focus model as the automatic execution model in his integrated choking process model. The automatic execution model is based on the same research and tenets as the self-focus model.

Figure 1: Integrated model of choking in sport. Reproduced from Wang (2002) with permission.



According to the choking process model in sport, when an athlete performs in a pressure situation, the demands of that specific situation vary according to that athlete's perception of the pressure, which are influenced by the athlete's stable personality factors as well as the unstable factors (both internal and external), athlete's self-awareness, and state anxiety. Once the athlete perceives pressure, the athlete enacts either an approach or avoidance coping strategy that makes choking more or less likely, respectively. Also factoring into the probability of choking is whether or not the task is effort- or skill-

dominant, with effort-dominant tasks making choking less likely. The final two variables considered in the model are skill-level and type of skill-dominant task (task requiring motor skills or perceptual skills). Finally, the integrated choking model allows for two performance outcomes from this process: choking due to distraction (most common for novice athletes and tasks requiring perceptual skills), and choking due to self-focus (most common for elite athletes and tasks requiring motor skills) (Wang, 2002).

The choking process model offers an explanation for the individual differences in the athlete's reactions to pressure and the likelihood of choking. The multidimensionality of the model considers important factors in choking that result in a range of performance outcomes. Within this model, the type of choking an athlete experiences depends on a number of factors. As in the distraction model, performers become worried or concerned with task-irrelevant factors resulting in performance decrements which are common for novice athletes with less experience than elite athletes. Comparable to the self-focus model, where 'expert' skills break down under pressure which is most likely to occur for elite athletes who typically practice their skills at high levels. This model includes key factors that influence the probability and type of choking an athlete experiences.

Wang's model applies to the current dissertation in several ways. First, the variables of interest in this dissertation are denoted in Wang's model as the "Stable Causes" (self-consciousness and trait anxiety), as well as "Coping Strategies" (dispositional coping style) and will be discussed further in the Choking-Susceptibility Factors section in this literature review. Second, the sports of interest in this dissertation are considered "Skill Dominant Tasks" which require motor skills (e.g., tennis, volleyball, basketball, etc.). Third, the population of interest in this dissertation is elite athletes (Division 1 college athletes). As such, this dissertation is investigating factors in Wang's model that are specifically related to his flow-chart leading to *Choking due to*

Inhibition of Automatic Execution. It is important to highlight though that *Choking due to Inhibition of Automatic Execution* is not at the exclusion of *Choking due to Distractions* in this dissertation, it just relates to the greater allocation of pressure-induced attentional demands (as described previously) given the factors of interest. Further, it is important to iterate that Wang's model serves as a more sophisticated and comprehensive theoretical framework from which to understand choking in sport than previously existed; however, this does not imply that the model is static and/or unchanging. The choking construct is complex, and as such researchers are still working to understand and explain it in its complexity. In the following section, the factors that make an individual more susceptible to choking are considered.

CHOKING- SUSCEPTIBILITY FACTORS

Past research (Anshel, 1996; Baumeister, 1984; Baumeister & Showers, 1986; Baumeister & Steinhilber, 1984; Beilock & Carr, 2001; Beilock & Gray, 2007; Calvo, Alamo, & Ramos, 1990; Hardy et al., 1996; Heaton & Sigall, 1991; Hull, Reilly, & Ennis, 1990; Kurosawa & Harackiewicz, 1995; Masters, 1992; Mesagno, 2006; Murray & Janelle, 2003; Wang, Marchant, & Morris, 2004; Wang, Marchant, Morris & Gibbs, 2004) has determined a range of factors that influence an individual's susceptibility to experience choking which include stable dispositional characteristics and unstable situational factors.

Dispositional Factors

Self-consciousness, trait anxiety, and coping style are the three dispositional characteristics that have received the most attention in choking research as potential predictors of choking (or dispositional choking-susceptibility factors). According to the choking literature, these dispositional characteristics are viewed as stable.

Dispositional Self-Consciousness

Self-consciousness is defined as the consistent tendency or trait of individuals to direct attention either inwardly or outwardly (Fenigstein, Scheier, & Buss, 1975). Those individuals that become inwardly focused more easily are individuals that are likely to become concerned about the relationship between themselves and other individuals in most situations (Wang, 2002). Further, self-conscious individuals believe themselves to be the target of other individuals' observations and their over-sensitivity leads to further self-focus (Fenigstein, 1979; Woody, 1996).

Self-consciousness is a predicted mediator of choking because it is closely associated with self-awareness (Baumeister, 1984; Heaton & Sigall, 1991). Fenigstein et al. (1975) defined self-awareness as a state (as opposed to trait) of self-directed attention, as a result of transient situational variables, chronic dispositions, or both. The fundamental difference between self-consciousness and self-awareness is that self-consciousness is a predisposition to direct attention either inwardly or outwardly, whereas self-awareness is a state of attentional focus reflected inwardly during a specific event (Mesagno, 2006). Masters, Polman, and Hammond (1993) asserted that a self-conscious predisposition enhances the probability of being self-aware during pressure situations. Research supports this assertion and finds that individuals with high self-consciousness are more adversely affected by factors (e.g., induced by presence of video camera and audience) that increase pressure and therefore enhance self-awareness (Carver, Antoni, & Scheier, 1985; Cheek & Briggs, 1982; Hull & Young, 1983).

It has been suggested that individuals high in self-consciousness are concerned about other individuals' expectations which consumes resources necessary for other cognitive processes and, as a result, disrupt performance (Hull, Reilly, & Ennis, 1990). Therefore, individuals with high self-consciousness are more negatively affected by

increased self-awareness because their awareness increases attention to self- and other-evaluation (Mesagno, 2006). As a result, researchers (e.g., Masters et al., 1993, Mesagno, 2006, and Wang, Marchant, Morris, & Gibbs, 2004) have asserted and empirically supported that high self-consciousness is a predictor of choking.

Dispositional Anxiety

Another mediator that has received attention in the choking literature is trait anxiety. Anxiety has been defined as the dispositional characteristic to interpret a majority of situations as threatening and to react in these situations with state anxiety (Halvari & Gjesme, 1995; Spielberger, 1966). Individuals with high anxiety generally respond to pressure situations with more frequent and/or intense state anxiety or feelings of tension than people low in anxiety (Spielberger, Anton, & Bedell, 1976). Additionally, individuals high in anxiety are likely to respond to ambiguous stimuli as threatening (Calvo, Eysenck, & Castillo, 1997).

Research has also drawn a connection between anxiety and performance. In general, individuals high in anxiety perform poorer in pressure situations than individuals low in anxiety (Calvo, Alamo, & Ramos, 1990; Kurosawa & Harackiewicz, 1995). This is attributed to the self-evaluative and self-depreciative thinking in which high anxiety individuals engage during pressure situations (Wine, 1971). Researchers have found that individuals higher in anxiety are more susceptible to performance decrements in pressure situations compared to their low-anxious counterparts (Murray & Janelle, 2003), and concluded that anxiety is a significant predictor of choking (Wang, Marchant, Morris, & Gibbs, 2004).

Coping Style

Coping has been defined as cognitive and behavioral efforts to master, reduce, or tolerate demands (Folkman & Lazarus, 1980). According to Folkman and Lazarus (1988), coping occurs after an individual's initial appraisal of a situation and attendant emotions which lead to regulation of the person-environment relationship. This process results in a re-appraisal of the situation and consequent changes in emotional quality and intensity. The coping process generally involves either emotion regulation or problem-solving (Lazarus & Folkman, 1984). However, whether or not coping reduces perceived pressure depends on the individual's coping style (Mesagno, 2006). Coping style is a dispositional characteristic that reflects an individual's propensity to respond to a particular situation in a certain manner which includes enacting a particular coping strategy (Anshel, Jamieson, & Raviv, 2001).

In sports psychology, the coping styles primarily researched are approach and avoidance (Anshel, 1996; Anshel & Weinberg, 1999; Roth & Cohen, 1986; Williams & Krane, 1992). The approach coping style refers to direct cognitive and behavioral problem-solving efforts to reduce stress intensity, whereas the avoidance coping style refers to repressive coping in which activity and attention are directed away from the threatening situation (Anshel & Weinberg, 1999). Anshel (1996) identified that approach coping athletes endeavor to understand the pressure they experience in performance situations. Conversely, the avoidance coping athletes do not endeavor to problem-solve, which allows them the ability to remain attentionally-focused. Research has found that the avoidance coping style is associated with stress-reduction in circumstances that are beyond the athlete's control, more so than approach coping style (Mullen & Suls, 1982; Roth & Cohen, 1986). Also, research has found that avoidance coping is not related to

choking whereas approach coping is significantly related (Wang, Marchant, & Morris, 2004).

Dispositional self-consciousness, trait anxiety, and coping style (approach) are the three dispositional factors that have been identified in the choking literature as making an athlete more choking-susceptible if the traits are endorsed (Mesagno, 2006, 2008, & 2009). It is important to highlight that the opposite end of the performance spectrum from choking is peak performance or "flow," in which the opposite characteristics have been found to be involved; a reduction or complete loss of self-consciousness, sense of control (as opposed to anxiety which is largely a lack of sense of control), and clear goals as to reduce the need to think about decisions regarding what should be done and just focus on completing the task as opposed to approach coping (Hill, 2001; Jackson & Csikszentmihalyi, 1999; Nideffer, 1992).

Situational Factors

Situational factors in sports are viewed as changeable, unstable internal and external aspects of performance that may make an athlete more susceptible to choking. Internal factors may be expectations of self and others, or the importance of performance, while external factors may be audience, performance-contingent rewards, and competition level (Singer, 1986). Athletes can learn to manage their perceptions of these factors even though they may negatively affect performance (Mesagno, 2006). The three factors commonly researched and highlighted in this literature review are the presence of an audience, performance-contingent rewards, and competition.

Audience

The mere presence of an audience adds to the importance of an athlete performing well, thus increasing pressure (Baumeister & Steinhilber, 1984). Self-awareness and self-

presentation are the primary theoretical explanations for the effects an audience has on performance (Bond, 1982; Duval & Wicklund, 1972). Self-presentation is described as processes that individuals utilize in an effort to control the impressions others form of them (Leary & Kowalski, 1990). Also influencing the effects on performance are audience features such as size and degree of supportiveness (Mesagno, 2006). Although the use of an audience to manipulate pressure in studies is common (Baumeister, 1984; Baumeister & Steinhilber, 1984; Hardy et al., 1996; Heaton & Sigall, 1991; Masters, 1992), research is inconclusive as to the specific circumstances in which an audience is facilitative or debilitative to performance.

Performance-Contingent Rewards

At higher levels in sports, performance is reinforced through college scholarships, lucrative contracts, and sponsorship deals which place increased pressure on athletes. Because of these realities in sports performance, researchers have investigated the effects of performance-contingent rewards. Specifically, performance has been affected in studies that offer monetary incentives (Baumeister, 1984; Beilock & Carr, 2001; Lewis & Linder, 1992; Masters, 1992). Baumeister and Showers (1986) found that participants offered a monetary reward for a successful performance performed significantly worse than control group participants not offered the reward. A similar finding was found in Mobbs et al. (2009) study (which was discussed in the Neurobiological Markers of Choking section) where participants were monetarily-incentivized and that participants were less successful in "capturing" high pay-off prey than in capturing low pay-off prey. It has been purported that performance-contingent rewards may distract the athlete and decrease intrinsic motivation (Baumeister & Showers, 1986).

Competition

Competition is another factor that has been used to manipulate pressure in choking research. Competition has been divided into those situations where an individual's performance is compared with others (explicit), or with an individual's previous performances (implicit) (Baumeister & Showers, 1986). In sports research, participation in competitive sports often results in feelings of concern and worry, thus increasing perceptions of threat which may influence choking (Gould, Jackson, & Finch, 1993; Leary, 1992; Wong, Lox, & Clark, 1993). Performance outcome has been identified as one aspect of increased perceived pressure in competition (Baumeister, 1984). More choking-susceptible athletes than choking-resistant athletes become preoccupied with performance outcome, and concern themselves with thoughts of winning and losing (Bond, 1986).

MINDFULNESS

Another construct of interest in this dissertation is mindfulness. Mindfulness is a construct that has received a great deal of attention in Western psychological literature in the past few decades for its positive impact on the lives of individuals, both in daily living and in symptom-relief for a host of ailments. Despite the relatively recent interest in this construct in Western medicine and psychology, it stems from Buddhist thought and Eastern meditative practices that have been observed for centuries. However, the concept of mindfulness is not unique to Buddhist thought and has been found in a variety of philosophical and psychological traditions throughout time including ancient Greek philosophy, existentialism, transcendentalism, and humanism to name a few (Brown, Ryan, & Creswell, 2007). In addition, researchers have postulated it to be a commonality among the diverse array of schools of thought in psychotherapy (Martin, 1997; Segal, Williams, & Teasdale, 2002). Brown et al. (2007) suggested the pervasive nature of

mindfulness in the literature is demonstrative of its "centrality to the human experience, and indeed, mindfulness is rooted in the fundamental activities of consciousness: attention and awareness" (p. 212).

Defining and operationalizing mindfulness has presented more of a challenge for mindfulness experts than acknowledging its existence. Semantic variations exist in the literature; however, the one aspect the experts agree upon is that some level of present-moment awareness is central to the construct (Grossman, 2008). Kabat-Zinn (2003) defined mindfulness as "awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (p. 1454) which is similar to Brown and Ryan's (2003) definition of mindfulness as "a receptive attention to and awareness of present events and experience" (p.212). McKay, Wood, and Brantley (2007) describe mindfulness with a bit more specificity as "the ability to be aware of your thoughts, emotions, physical sensations, and actions- in the present moment- without judging or criticizing yourself or your experience" (p. 64). Taken together, these definitions provide a description of mindfulness as it is conceptualized in the current study.

Mindfulness is considered both a natural human capacity (Kabat-Zinn, 2003), as well as a skill that can be cultivated (Bishop et al., 2004). Meditation practice allows individuals to develop the state or skill of mindfulness; however, Kabat-Zinn (2005) clarifies that meditation is a type of "scaffolding" used to achieve a mindful state, but is not mindfulness itself (as cited in Shapiro, Carlson, Astin, & Freedman, 2006). In essence, the goal of mindful awareness is to influence how one experiences content (as opposed to changing content), which in turn informs the individual's behavior (McCracken, Gauntlet-Gilbert, & Vowles, 2007).

Past research on mindfulness has primarily centered on evaluating the efficacy of mindfulness-based interventions, generally with supportive results (Shapiro et al., 2006). However, over the past decade, the focus of the research has broadened to include examining the mechanisms underlying mindfulness, mindfulness' relation to other constructs, and continually working towards an optimal operational definition of mindfulness. Of particular interest to this dissertation are recent studies investigating mindfulness and psychological well-being (Brown & Ryan, 2003; Carlson & Brown, 2005; Carmody & Baer, 2008; Shapiro, Oman, Thoresen, Plante & Flinders, 2008) and mindfulness and "flow" states (Kee & Wang, 2007).

MECHANISMS OF MINDFULNESS

Bishop, Lau, Shapiro, Carlson, Anderson, and Carmody (2004) explored mechanisms of mindfulness and proposed a two-component model which includes the self-regulation of attention and the individual's attitude. Shapiro, Carlson, Astin, and Freedman (2006) expanded upon Bishop et al.'s proposed model of mindfulness to include a third component, intention, to the model. Shapiro et al. suggested the three components or axioms of mindfulness are interwoven in a cyclical and simultaneous process to effect positive change in the individual.

The self-regulation of attention refers to an individual's ability to be aware of one's internal and external present moment experience without judgment by regulating attentional focus (Bishop et al., 2004; Shapiro et al., 2006). Feelings of alertness and living fully in the present moment are associated with self-regulation. Additionally, it contributes to stable functioning and adaptability in new situations (Kabat-Zinn, 1990). The core characteristics of attentional self-regulation are thought to include the following; 1) an ability to sustain one's attention over a period of time, 2) intentionally "switching" one's focus between objects, and 3) reducing (if not expelling) ruminative

and elaborative processing of an experience (Araas, 2008; Bishop et al., 2004; Borkovec & Costello, 1993; Shapiro et al., 2006). Lending further support to the facilitative role attention plays in mindfulness is Shapiro et al.'s (2006) assertion that attention is a curative force on its own by encouraging the individual to directly experience the moment rather than interpret it (Shapiro et al., 2006).

Attitude, or "the *qualities* one brings to attention," is the second component in both Bishop et al.'s and Shapiro et al.'s model. By attitude, the authors are asserting the importance of individuals practicing kindness and acceptance of the self in the moment without negative evaluation. As individuals embrace an attitude of self-compassion, friendliness, acceptance, and non-striving, it allows for them to accept reality as it is and not to force a different experience from the moment (Shapiro et al., 2006).

Intention is the third component included in the model of mindfulness. Intention refers to the individual's purpose in practicing mindfulness. Shapiro et al. (2006) note that one's intention is a fluid and ever-changing aspect of mindfulness, and possessing the intent (whatever it might be at the moment) is an essential aspect to mindfulness.

Shapiro et al. (2006) proposed a "meta-mechanism of action" labeled reperceiving which incorporates the three building blocks of mindfulness; attention, attitude, and intention. They assert that reperceiving is the potential change agent of mindfulness. Reperceiving is described as the process of attending (*attention*) with intention (*intention*), non-judgmentalness and acceptance (*attitude*) to bring about a change in perspective or behavior. Specifically, the shift occurs with one's relationship to their thoughts and emotions that results in "greater clarity, perspective, objectivity, and ultimately equanimity" (p. 379). The authors suggested that the ability to view one's internal and external experience with objectivity is a natural and normal occurrence in the developmental process; however, mindfulness can accelerate this process.

DISPOSITIONAL MINDFULNESS

The capacity to be mindful and harness mindfulness is inherent to all individuals; however, its expression in the individual is varied (Bodner & Langer, 2001; Kabat-Zinn, 2003; Lakey, Campbell, Brown, & Goodie, 2007; Takahashi, Murata, Hamada, Omori, Kosaka, Kikuchi, Yoshida, & Wada, 2005). Brown et al. (2007) described dispositional mindfulness as the trait quality or tendency to be in mindful states for periods of time. As stated previously, a majority of mindfulness research has focused on evaluating the efficacy of mindfulness-based interventions (e.g., Mindfulness-Based Stress Reduction, Mindfulness-Based Cognitive Therapy, Acceptance and Commitment Therapy, Dialectical Behavior Therapy). These types of interventions have been successful in reducing both psychological and physical health symptoms associated with a variety of conditions and diseases, as well as increasing psychological well-being (Brown et al., 2007; Kabat-Zinn, 2003). These profound results have piqued the interest of researchers and incited further study involving the more naturally occurring aspects of mindfulness (Araas, 2008).

Thus far, research on dispositional mindfulness has had similar findings to the research on mindfulness-based interventions. Dispositional mindfulness has been associated with less psychological distress, and the promotion of psychological well-being and functioning (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Coffey & Hartman, 2008; Masicampo & Baumeister, 2007). Psychobiological researchers also found that dispositional mindfulness was associated with enhanced prefrontal cortical regulation of affect and amygdala activation which, in turn, has been linked to reductions in negative affect, mood, and physical symptoms in diverse populations (Creswell, Way, Eisenberger, & Lieberman, 2007).

Masicampo and Baumeister (2007) suggested that dispositional mindfulness may be a product for individuals that are comfortable and relatively worry-free in their current state of being. Other researchers have suggested potential constructs that comprise dispositional mindfulness. Baer, Smith, and Allen (2004) identified the following four constructs involved in dispositional mindfulness: (1) experiencing the present moment without judgment (2) and with acceptance (3) while observing internal and external stimuli (4) and acting with awareness. While the research on dispositional mindfulness is still in its nascent stage, current findings are illuminating the important role it plays in human functioning. For this reason, it is pertinent to continue exploring the role and relationship dispositional mindfulness maintains with different constructs, such as those relevant to this dissertation.

MINDFULNESS IN SPORT

Despite the dearth of mindfulness research in sports psychology, it has been stated time and time again that it is of critical importance to execute skills with *a quiet mind* (Jackson & Beilock, 2008), and some of the biggest names in sport have endorsed its relevance and importance to a successful performance. For example, Tiger Woods, Apolo Ohno, and Phil Jackson have all touted the positive effects of mindfulness not only in preparation for competition, but performance in sport (Huynh, Gotay, Layi, & Garrard, 2007; Jackson, 1995). And it is not too difficult to make the connection why mindfulness in sports is relevant.

Mindfulness is "fundamentally an attentional construct" and concentration and attention are paramount to performing well in sport (Lakey et al., 2007, p. 1699; Ungerleider, 2005). This relationship between mindfulness and one of its essential elements, attention, is noteworthy because achieving a level of present-moment focus in competition has been linked to peak performance in sport or "flow" (Jackson &

Csikszentmihalyi, 1999; Jackson & Delehanty, 1995; Nideffer, 1992; Orlick, 1990; Ravizza, 2002 as cited in Kee & Wang, 2007). Present-moment focus allows the athlete to not be distracted by the past or future and "live in the here and now." Additionally, this relationship between mindfulness and attention is critically important to this dissertation because it has been asserted and empirically supported that choking in sport occurs as a result of attentional problems (Baumeister, 1984; Beilock & Carr, 2001; Carver, 1979; Carver & Scheier, 1981; Lewis & Linder, 1997; Markman et al., 2006; Masters, 1992; Nideffer, 1992; Weinberg, 1988). Therefore, in theory it is logical to assume that since both peak performance and choking in sport performance are largely attributed to attentional issues (albeit, peak performance is at the functional end of the attentional (and performance) spectrum, whereas choking is at dysfunctional end), and an essential component of mindfulness is attention, they may all be related. However, thus far only one study has been published investigating the relationship between mindfulness and flow dispositions in sport (addressed below), and there are not any empirical studies concerning mindfulness and factors related to choking in sport that have been published to date.

It is important to clarify that studying mindfulness and performance in sport is difficult due to the fact that inherent to the mindfulness construct is present-moment focus as explicated by Kee and Wang (2007). Therefore, inquiring about an athlete's focus during action would be disruptive and ultimately alter their focus. For this reason, it has been suggested by researchers (i.e., Kee and Wang) that studying mindfulness at the dispositional level may be the first step in better understanding this construct in sports psychology, and the present study heeded that suggestion.

Initial investigation into mindfulness and sports was conducted by Gardner and Moore (2004). Specifically, they researched the efficacy of the Mindfulness-Acceptance

Commitment approach they developed for athletes for the purpose of enhancing performance. In their study, Gardner and Moore (2004) evaluated their protocol with two athlete-participants that were trained in strategies and techniques to develop self-regulation of present moment focus (e.g., mindfulness of breath and body exercises, mindful pre-performance stretch, mindful drills/practices). Findings supported improvements in practice and competition, and overall increased enjoyment in sport participation.

In another recent investigation on mindfulness in the sports context, Kee and Wang (2007) researched the relationships between mindfulness, flow dispositions, and mental skills adoption in a university student population. Flow, or the ability to achieve a state of deep absorption in an activity that is intrinsically enjoyable and successful for the participant, is intricately linked to peak performance in athletics (Csikszentmihalyi, 1990; Nideffer, 1992). Flow, like choking, is an inconsistent, but impactful state of performance (Hill, 2001). Of particular interest to the current study, Kee and Wang found that individuals with the propensity to be mindful were more likely to experience flow states-and experiencing flow states is associated with having a strong performance, the opposite of choking. Therefore, the findings from Kee and Wang's study, coupled with Gardner and Moore's (2004) research, highlight the importance of further inquiry into better understanding the connection between psychological factors in sport and mindfulness. Better understanding this relationship allows for greater insight into the athlete's psyche, and thus, may contribute to the development of more effective interventions for choking.

PSYCHOLOGICAL WELL-BEING

The third major construct of interest in this dissertation is psychological well-being. Psychological well-being is a multi-faceted construct that has drawn the interest of researchers over the past few decades (Diener, Suh, Lucas, & Smith, 1999). It is

frequently cited in the psychological literature in the following ways: 1) in the most general sense of the term (i.e., referring to psychological well-being without clearly specifying what dimensions comprise well-being); 2) addressing the specific dimensions that comprise well-being; and 3) its relationship to a multitude of constructs that describe human functioning (i.e., aging, self-esteem, body image, achievement, job satisfaction). Despite the wide-spread endorsement of psychological well-being as an integral component to human functioning, it has proven to be a more difficult construct to define and operationalize (Ryff, 1995). In the most simplistic terms, psychological well-being encompasses optimal experience and functioning in an individual's life (Ryan & Deci, 2001). The succinctness of this definition camouflages the construct's complexity which will be addressed in the following paragraphs.

Although what constitutes "optimal experience and functioning" for an individual has been and continues to be a highly debated issue, Ryan and Deci (2001) contributed to the understanding of well-being in the field of empirical psychology with their integrative review on the construct. Most importantly, they explicated the two perspectives in which well-being is derived: hedonic well-being which primarily involves happiness, and eudaimonic well-being which concerns the individual's potential across a number of domains (Keyes, Shmotkin, & Ryff, 2002; Ryan & Deci, 2001; Waterman, 1993).

Hedonic psychologists describe well-being as encompassing the individual's subjective happiness and focus on pleasurable experiences, both in mind and body (Kubovy, 1999; Ryan & Deci, 2001). This has most commonly been assessed by a measure of subjective well-being. Subjective well-being (SWB), also referred to as happiness, consists of three factors which include life satisfaction, presence of positive affect, and the absence of negative affect (Diener & Lucas, 1999; Ryan & Deci, 2001). On the other hand, eudaimonic well-being refers to an individual's self-fulfillment in

terms of environmental mastery, self-acceptance, relationships with others, satisfaction with life, etc. (Keyes, Shmotkin, & Ryff, 2002). Eudaimonic well-being is commonly referred to as psychological well-being (PWB) in the field as termed by Ryff (1989).

Whereas subjective well-being assesses happiness in the present moment as determined by positive and negative affect and life satisfaction, psychological well-being accounts for the challenges one encounters in life en route to healthy functioning (Keyes, Shmotkin, & Ryff, 2002). Though both contribute immensely to the current understanding of well-being, this proposal is focused on assessing dimensions of psychological well-being. This decision was made as a result of the population of interest, athletes. Generally, it could be stated that athletes often forgo more short-term enjoyment (hedonic well-being) for the pursuit of longer term goals that contribute meaning to their lives (eudaimonic well-being) (i.e., beating a personal best, achieving a higher ranking, etc.). Additionally, subjective well-being has been classified as more of a passive condition whereas psychological well-being is considered an active condition (Chatzisarantis & Hagger, 2007). Therefore, the psychological well-being construct was deemed most appropriate for this exploratory study.

Ryff (1989) conducted a study exploring the factors involved in psychological well-being. Ryff reviewed theory from a number of different domains in psychology to arrive at a set of dimensions in which the literature converged. Ryff postulated that six different factors encompass "challenged thriving" (Keyes, Shmotkin, & Ryff, 2002, p. 1008). The six factors are: 1) *self-acceptance*, or understanding one's limitations, but reflecting positively on oneself; 2) *positive relations with others*, or the ability to develop and maintain strong personal relationships with others; 3) *environmental mastery*, or possessing the ability to effect change in the environment to meet the needs and desires of the individual; 4) *autonomy*, or pursuing self-determination, individuality, and

personal authority; 5) *purpose in life*, or the meaningful pursuit of one's goals; and lastly, 6) *personal growth*, or capitalizing on one's strengths and talents (Ryff, 1989; Keyes, Shmotkin, & Ryff, 2002). The scales comprising psychological well-being [4] have been evaluated and utilized in a multitude of studies (well over 130 studies) concerning the impact different psychological processes and challenges (i.e., work aspirations and achievements, body consciousness, personal projects, and recovery from depression) have on well-being (Carr, 1997; Fava, Rafanelli, Grandi, Conti, & Belluardo, 1998; McGregor & Little, 1998; McKinley, 1999). By the diversity and sheer number of studies that have been conducted regarding psychological well-being, this construct's fundamental role in human functioning is naturally applicable to a variety of populations, including athletes.

PSYCHOLOGICAL WELL-BEING IN SPORT

It has been well documented that participation in regular physical exercise is linked to increased physical well-being, but it has also been associated with enhanced psychological well-being as well (Biddle, Fox, Boutcher, & Faulkner, 2000; DiBartolo & Shaffer, 2002; Hagger & Chatzisarantis, 2005; Liu & Yang, 2002; Malebo, van Eeden, & Wissing, 2007). A majority of the inquiries regarding psychological well-being in sport stem from human motivation theory, specifically self-determination theory. Ryan and Deci (2000) identified three innate psychological needs that are necessary for an individual's development and growth: competence, autonomy, and relatedness. These three factors at the core of self-determination theory are three of the six dimensions contained in Ryff's psychological well-being scale. Studies evaluating psychological

[4] As will be discussed in the Methods section, the PWB (Ryff & Keyes, 1995) does not produce a composite score from the six dimensions, but rather each dimension acts as its own individual contribution to the overall construct of psychological well-being.

well-being in the sport environment have used some variation of the three factors identified in self-determination theory to represent psychological well-being. For this dissertation, environmental mastery and autonomy will be evaluated in terms of their relationship to the dispositional factors associated with choking-susceptibility and mindfulness.

Studies conducted by Malebo, van Eeden, and Wissing (2007) as well as Liu and Yang (2002) investigated the relationship between individuals that participate in a sport and those who do not in relation to overall psychological well-being. Malebo et al. conducted their study with a population of young adults (age 20-35) while Liu and Yang used a university population. Their findings supported theoretical assumptions and previous research that found sport participation to be facilitative to one's psychological well-being. Malebo et al. were also interested in exploring if the individual's psychosocial development may hold some explanatory power for the relationship found in previous studies that sport participation extends beyond the individual to also contribute to the overall psychosocial wellness of families and communities. They found that individuals who participate in sport demonstrated increased levels of psychosocial development compared to those who do not participate in sport, lending support to this proposed relationship.

Chatzisarantis and Hagger (2007) contributed to the dialogue regarding the relationship between psychological well-being and sport participation. However, they examined if a difference existed in psychological well-being and aspirations between individuals participating in competitive athletics and recreational athletics. Their study produced three relevant and interesting findings to this dissertation. First, individuals participating in recreational athletics demonstrated higher psychological well-being than those participating in competitive athletics. Second, in line with previous research, they

found type of aspiration (intrinsic or extrinsic) is an important predictor in psychological well-being. Thirdly, recreational athletes demonstrated a preference for intrinsic aspirations (e.g., growth, health, meaningful relationships) over extrinsic aspirations (e.g., monetary rewards, image, fame) and vice-versa for competitive athletes. Therefore, the researchers concluded that aspirations (intrinsic or extrinsic) are more relevant to the athlete's psychological well-being than sport participation *per se*.

Psychological well-being in athletes has also been considered in studies regarding motivational attributes (i.e., coaches, perceived ability, rewards) in sport and their effect on athletes (Reinboth & Duda, 2004, 2006). Coaches, as well as significant others in an athlete's life, contribute to the athlete's social environment. Previous research has found that athletes may experience adverse psychological and physical effects as a consequence of external pressures, like coaches' and parents' expectations and other extrinsic motivators (Duda, 2001; Krane, Greenleaf, & Snow, 1997 as cited in Reinboth & Duda, 2006).

Central to Reinboth and Duda's studies (2004, 2006) are evaluating what aspects of the athlete's environment are facilitative or potentially debilitative to an athlete's well-being. Specifically, they found that if coaches create a task-involving environment (an environment where attainment of goals and success are seen as self-referenced or within the individual's control) as opposed to an ego-involving environment (an environment where athletes concern themselves with aspects of sport out of their control like future advancement in competition, rewards, social approval, and aspects of performance pressure), the athlete's well-being is protected if not enhanced, due to a sense of competence that is developed (Duda, 2001 as cited in Reinboth & Duda, 2006). However, if the environment is more ego-involving, the athlete may find they are more concerned with protecting their perceived ability. As a result, the athlete's perceptions of

competence are "more fragile because competence is construed on the basis of what others have done/are doing and there is greater preoccupation with the adequacy of one's ability" (Reinboth & Duda, 2006, p. 271). One can extrapolate how a fluctuating sense of competence may be debilitative to an athlete's psychological well-being, and research has found a negative relationship between perceptions of an ego-involving environment and two of the 3 basic psychological needs outlined by Ryan and Deci (2000), autonomy and relatedness (Sarrazin, Guillet, & Cury, 2001).

Psychological Well-Being and Choking

Limited research exists between psychological well-being and choking, and the research that does exist is primarily qualitative. Gucciardi, Longbottom, Jackson, and Dimmock (2010) published the results from their qualitative examination of experienced golfers' experiences and perspectives on choking. Of particular relevance to psychological well-being and choking, Gucciardi et al. identified specific consequences athletes reported in terms of choking. Athletes reported that one of the most common consequences of choking was losing confidence, as well as trust in one's physical abilities. Additionally, athletes cited experiencing emotional distress after choking including a range of negatively construed emotions such as disappointment and anger. Athletes also reported a loss of enjoyment for playing their sport after choking. This was particularly true for athletes that experienced more chronic forms of choking. Gucciardi et al.'s study is important because it identified specific consequences of choking that negatively affect psychological well-being which had not been previously addressed.

In addition to Gucciardi et al.'s research, other researchers and coaches have surmised the negative impact choking has on the athlete's psychological well-being. Wang et al. (2003) claimed that choking in sport and psychological well-being "has become a critical issue that significantly affects [the athlete]" (p.69). It can be drawn

from the previous studies reviewed regarding sport and psychological well-being that while sport can be facilitative to psychological well-being, this finding cannot be generalized across all levels of competition in sport. For example, Chatzisarantis and Hagger (2007) found competitive athletes did not display as high of levels of psychological well-being as recreational athletes. This finding highlights that the competitive sport environment is unique with respect to the demands it places on the athlete, and the potential negative impact it has on these athletes. Reinboth and Duda (2004 and 2006) further validated the unique attributes of competitive sport, in terms of the external pressures experienced by athletes. Specifically, they found that the athlete may experience a fluctuating sense of competence as a result of the type of environment the coach creates for their athletes. Taken all together, it is evident that research investigating how pressure and associated factors in the competitive sport environment impact an athlete's psychological well-being is warranted.

PSYCHOLOGICAL WELL-BEING AND MINDFULNESS

The belief in the positive relationship between mindfulness and well-being has existed for centuries (Brown & Ryan, 2003), but only recently has it been evaluated empirically. Thus far, findings from the studies (Brown & Ryan, 2003; Carlson & Brown, 2005; Carmody & Baer, 2008; Shapiro, Oman, Thoresen, Plante & Flinders, 2008) evaluating the relationship between these two constructs have provided support for this long-held belief. Each study demonstrated that high levels of mindfulness were associated with higher levels of both hedonic and eudaimonic well-being, and lower levels of stress symptoms, mood disturbance, and rumination. Specific to the current study were Brown and Ryan's (2003) findings that higher levels of mindfulness (as measured by the *Mindfulness Awareness Attention Scale* (MAAS)) were associated with

higher levels of eudaimonic well-being; autonomy, competence, and relatedness (as measured by the *Ryff Scales of Psychological Well-Being*)[5].

Brown and Ryan (2003) provided three hypotheses to explain the facilitative relationship of mindfulness to well-being. One reason mindfulness may play an important role in psychological well-being is because it allows individuals to disengage from "automatic thoughts, habits, and unhealthy behavior patterns and thus could play a key role in fostering informed and self-endorsed behavioral regulation, which has long been associated with well-being enhancement…Further, by adding clarity and vividness to experience, mindfulness may also contribute to well-being and happiness in a direct way" (p. 824).

As discussed previously, theories of self-regulation, like self-determination theory, postulate that awareness and attention (essential ingredients of mindfulness) maintain and enhance the individual's psychological and behavioral functioning (Brown & Ryan, 2003). It has been hypothesized that a second reason mindfulness is facilitative to psychological well-being is through the "self-regulated activity and fulfillment" of basic psychological needs for individual growth: autonomy, competence, and relatedness (p.824). In this way, the individual will be more aware to satisfy and take care of issues that stem from these basic psychological needs.

The third reason mindfulness is thought to facilitate psychological well-being according to Brown and Ryan (2003) is through its association with "higher quality or optimal" present-moment attention. They also provide an example of a study conducted by LeBel and Dube´ (2001) in which participants were instructed to either pay attention to their chocolate eating or were distracted from it. Participants that were focused on their

[5] The same measures used in Brown and Ryan's (2003) study to assess mindfulness (MAAS) and psychological well-being (PWB) will be used in this dissertation as well. See more in Chapter Three's Methods section.

chocolate eating endorsed more pleasure in eating than the distracted chocolate eaters. Brown and Ryan note that this type of optimal present-moment focus is similar to Csikszentmihalyi's (1990) definition of "flow" (a type of attention that yields enjoyment, vitality, and success).

The empirically supported relationship between psychological well-being and mindfulness is significant to this dissertation in that it clearly establishes the connection between overall healthier human functioning and mindfulness. Therefore, it is logical to assume that behaviors and traits that do not promote healthy psychological functioning, like dispositional factors associated with choking, would be negatively related to mindfulness and psychological well-being. As such, one of the primary goals of this dissertation is to better understand the relationship between these constructs in elite athletes.

CONCLUSION

As previously stated, inherent to competitive athletics are the taxing levels of performance pressure and environmental demands (Baillie & Ogilvie, 2002). While some athletes thrive in these conditions, others experience deleterious effects, such as choking. Gardner and Moore (2007) asserted the importance of researching all variables (e.g., psychological, behavioral, life stressors) in competitive sport that "covertly and overtly impair or delay one's functioning" (p. 18). Choking in sport certainly can be considered a psychological process that not only impairs and/or delays an athlete's performance, but an athlete's psychological well-being as well (Goorjian, 2002; Gucciardi et al., 2010; Mesagno, 2006; Wang et al., 2003). To date there are limited interventions and treatments to address choking in sport (Mesagno et al., 2008; 2009). This, coupled with the fact that more traditional performance enhancement interventions (i.e., imagery, arousal control, self talk) have been met with inconsistent research findings, has led to a

call for researchers "to develop new theoretical models for understanding functional and dysfunctional athletic performance" (Gardner & Moore, 2007, p.27).

This dissertation heeds this advice and investigates the psychological construct, mindfulness, which has received positive attention in general psychology for its role in ameliorating symptoms for a diverse set of issues, and enhancing overall psychological well-being (Bishop et al., 2004; Shapiro et al., 2008). This construct has received notice in the sports' world as well. World-class athletes and coaches alike have spoken to the positive effects mindfulness can have on performance and well-being (Huynh et al., 2007). It also has recently been linked to "flow" dispositions (ability for athletes to experience peak performance, the opposite of choking) in sport (Kee & Wang, 2007). Characteristics identified in peak performance are the same as those identified in choking, just polar opposites; loss of self consciousness versus heightened self-consciousness, strong sense of control (minimal anxiety) versus lack of sense of control (anxiety), and a focus on completing the job without a tremendous amount of problem-solving versus approach (problem-solving) coping (Jackson & Csikszentmihalyi, 1999; Hill, 2001; Masters et al., 1993; Nideffer, 1992; Wang, Marchant, Morris, & Gibbs, 2004). While attentional mechanisms underlie both peak performance and choking, and attention is an essential component of mindfulness, only one study to date investigates mindfulness and "flow" dispositions. Further inquiry into the relationships between mindfulness and sports performance and factors affecting it is needed. Therefore, this dissertation endeavors to contribute to this dialogue by researching the relationships between dispositional factors associated with choking, mindfulness, and psychological well-being. This inquiry is deemed a starting point to further the understanding of the complexities involved in competitive sport and their impact on the athlete.

CHAPTER THREE: RESEARCH METHODOLOGY

STATEMENT OF PROBLEM

Choking, or a sub-standard performance resulting from performance pressure, negatively impacts the athlete, and has the potential to develop into more serious disorders (Beilock & Gray, 2007; Hays, 1999). Despite the significance of the issue, effective interventions and treatments are limited (Mesagno, 2009). In part this is due to the complexity of the construct, thus making it an imperative to continue researching choking and related variables.

Mindfulness has garnered much attention in both mainstream psychology and the sports' world (due to its endorsement from top-name athletes and coaches) for its role in positively affecting the mental and physical health, as well as performance, of individuals (Bishop et al., 2004; Huynh et al., 2007). However, it has been minimally researched in sport psychology thus far. Recently though, mindfulness was found to be positively related with peak performance (the opposite of choking) in athletes (Kee & Wang, 2007). Therefore, it is reasonable to theorize that mindfulness would be negatively related to choking. If this relationship between mindfulness and factors associated with performance is better understood, it may lead to the development of more effective interventions and treatments aimed at not only enhancing performance, but overall psychological well-being and healthy psychological functioning. Therefore, assessing psychological well-being in connection to choking and mindfulness is important because treatment should focus on the individual as a whole, and not solely the performance aspect.

STATEMENT OF PURPOSE

The purpose of this study is to explore the relationship between dispositional factors (self-consciousness, trait anxiety, and approach coping) associated with choking under pressure in competition, mindfulness, and dimensions of psychological well-being. This study attempts to lay the foundation for a better understanding as to how these variables interact with one another. Results from this study are intended to inform the development of effective interventions and treatments for athletes who experience performance anxiety and one of its effects, choking, in competition. The relationship between the variables of interest will be analyzed using simple correlation and univariate and multiple regression analyses.

RESEARCH QUESTIONS

RQ1. Will trait self-consciousness, anxiety, and coping style (dispositional factors associated with choking-susceptibility (DFC-S)) predict degree of mindfulness (MAAS) in athletes?

RQ2. Will trait anxiety, self-consciousness, and coping style (DFC-S) predict psychological well-being in athletes (as measured by the *Ryff Scales of Psychological Well-Being* subscales Environmental Mastery (PWB-EM) and Autonomy (PWB-A)?

RQ3. Will level of dispositional mindfulness (MAAS) be significantly related to athletes' psychological well-being (as measured by the *Ryff Scales of Psychological Well-Being* subscales Environmental Mastery (PWB-EM) and Autonomy (PWB-A)?

METHOD

Approval by Human Subjects Committee

This research was conducted in accordance with the guidelines set forth by the Institutional Review Board (IRB) for the Protection of Human Subjects at the University of Texas at Austin. IRB approval #2009-09-0083 was granted prior to any data collection (see Appendix A). In addition, this study complied with the Ethical Principals designated by the American Psychological Association (APA). Participation in this study was voluntary and contingent upon participant consent.

Participants

The current study included 111 elite college athletes, between 18 and 23 years of age, who were recruited from the University of Texas at Austin and Stanford University (both Division I athletic schools which indicates the highest level of intercollegiate athletics sanctioned by the National Collegiate Athletic Association (NCAA) in the United States) varsity sports teams (listed below). The participants recruited for the current study were roughly divided between the University of Texas at Austin and Stanford University. Athletes were recruited from sports that utilize closed-skills (habitual skills that are performed in a largely predictable, stable environment). Measures were administered to athletes participating in the following sports: baseball, basketball, rowing, softball, tennis, track and field (only throws and pole vaulting), and volleyball.

Measures

(Note: All measures are included in the Appendix.)

Self-Consciousness Scale

The *Self-Consciousness Scale* (SCS; Fenigstein et al., 1975) is a 23-item scale designed to assess individual differences in the tendency to focus one's attention on

oneself, referred to as dispositional self-consciousness. The scale has been used with previous research involving choking (e.g., Baumeister, 1984; Butler & Baumeister, 1998; Heaton & Sigall, 1991; Kurosawa & Harackiewicz, 1995; Lewis & Linder, 1997). The SCS is composed of three distinct subscales with 10 items measuring private self-consciousness (e.g., "I'm always trying to figure myself out"), 7 items measuring public self-consciousness (e.g., "I'm concerned about the way I present myself"), and 6 items measuring social anxiety (e.g., "I have trouble working when someone is watching me"). The SCS can be administered to a group and requires about 3-5 minutes to complete.

For each item on the SCS, respondents are asked to read a statement concerning their tendency to direct attention inward or outward and record a response indicating the degree to which they identify with the statement. Responses are provided on a four-point Likert-like scale, with the scores ranging from 1 (*extremely uncharacteristic*) to 4 (*extremely characteristic*). Fenigstein et al. reported that test-retest correlations for the subscales were: private self-consciousness, .779; public self-consciousness, .84; social anxiety, .73; and total score, .80. The scale has demonstrated construct and criterion related validity. The total scale score was used in the current study.

Sport Anxiety Scale

The *Sport Anxiety Scale-2* (SAS-2; Smith, Smoll, Cumming, & Grossbard, 2006) is a 15-item scale designed to assess trait anxiety with sports. The SAS-2 yields three subscales that measure individual differences in somatic anxiety, and two classes of cognitive anxiety, worry and concentration disruption. The previous version of the SAS-2 has been widely used in sport psychology research and relates cognitive and somatic anxiety components to performance. The SAS-2 can be administered to a group and requires about 3-5 minutes to complete.

The SAS-2 utilizes a four-point Likert-like scale for all items. The scores range from 1 (*not at all*) to 4 (*very much*) indicating the degree to which the respondent identifies with the given statement prior to or during competition. Smith et al. reported adequate internal consistency measured with Cronbach's alpha and test-retest reliability coefficients. The internal consistency coefficients were: somatic, .84; worry, .89; concentration disruption, .84; and total score, .91. Test-retest correlations for the subscales were: somatic, .76; worry, .90; concentration disruption, .85; and total score, .87, indicating acceptable measurement stability. Smith et al. also reported that construct validity was adequate after assessing convergent and discriminant validities of the scale. The total scale score was used in the current study.

The Coping Style Inventory for Athletes

The *Coping Style in Sport Inventory* (CSIA; Rawstorne, Anshel & Caputi, 1997) is a 16-item scale that is designed to assess coping strategies among competitive athletes. The CSIA assesses two major dimensions of coping style, approach and avoidance (8 items of each). Approach coping strategies often incorporate direct problem solving (e.g., "I tried to analyze the reasons for the unpleasant experience"). Avoidance coping strategies refer to desensitization or repressed coping (e.g., "I tried to forget about the unpleasant experience"). Rawstorne, Anshel and Caputi adapted the CSIA from previously validated scales of approach and avoidance coping in a sport and non-sport environment, respectively (Anshel & Kaissidis, 1997; Roth & Cohen, 1986). The CSIA can be administered to a group and requires about 3-5 minutes to complete.

The CSIA uses a five-point Likert-like scale for all items. The respondent reads the statement and identifies the degree to which they identify with the statement ranging from 1 (*very untrue*) to 5 (*very true*). The scale authors reported that CSIA had satisfactory concurrent and construct validity, as well as adequate internal consistency

with Cronbach's alphas of .72 and .75 for the approach and avoidance scales, respectively.

Mindfulness Awareness Attention Scale

The *Mindfulness Awareness Attention Scale* (MAAS; Brown & Ryan, 2003) is a 15-item scale that measures dispositional mindfulness or "the presence or absence of attention to, and awareness of, what is occurring in the present moment" (p. 824). The single-factor scale conceptualizes mindfulness specifically from an attention-based perspective, and is cited (Shapiro, 2008) as the most frequently used mindfulness scale. Therefore, the MAAS measures the presence (or lack thereof) of mindful attention and awareness states, as opposed to other aspects associated with mindfulness (e.g., compassion, empathy, and forgiveness). The MAAS uses a six-point Likert-like scale. The respondent reads the statement and identifies the degree to which they endorse the behavior in their life ranging from 0 (*almost always*) to 6 (*almost never*). Higher scores are indicative of higher levels of dispositional mindfulness. Example of items include, ''I break or spill things because of carelessness, not paying attention, or thinking of something else" and "I find myself preoccupied with the future or the past." Brown and Ryan reported that the MAAS has reliable internal consistency with a Cronbach's alpha coefficient of 0.82, and satisfactory convergent and discriminant validity.

The Ryff Scales of Psychological Well-Being

The *Ryff Scales of Psychological Well-Being* (PWB; Ryff & Keyes, 1995) is a frequently used instrument when assessing the multiple facets of psychological well-being. It has been used in research and published in over 140 articles on psychological well-being.

The PWB is an 84-item scale composed of six subscales with 14 items each; autonomy (e.g., "Being happy with myself is more important to me than having others approve of me."), environmental mastery (e.g., "I have difficulty arranging my life in a way that is satisfying to me"), personal growth (e.g., " I think it is important to have new experiences that challenge how you think about yourself and the world"), positive relations with others (e.g., "People would describe me as a giving person, willing to share my time with others"), purpose in life (e.g., "Some people wander aimlessly through life, but I am not one of them"), and lastly, self acceptance (e.g., "I like most aspects of my personality").

For each item on the PWB, respondents are asked to rate their level of agreement on a six-point Likert scale from 1 (*strongly disagree*) to 6 (*strongly agree*). Ryff and Keyes reported adequate internal consistency with the following Cronbach's alphas for each scale: .83 (autonomy scale), .86 (environmental mastery), .85 (personal growth), .88 (positive relations with others), .88 (purpose in life), and .91 (self-acceptance).

Due to the fact that the PWB measure does not produce an overall psychological well-being composite score, it is common for researchers to select those scales most pertinent to their studies. For this dissertation, the environmental mastery and autonomy subscales of the PWB were selected based on their use in past sport psychology research and relevancy to this dissertation. As defined by Ryff and Keyes, individuals with higher scores on the environmental mastery subscale have a sense of mastery and competence in managing the environment, control a complex array of external activities, make effective use of surrounding opportunities, and are able to choose or create contexts suitable to personal needs and values. Lower scores on the environmental mastery subscale are indicative of individuals whom have difficulty managing everyday affairs, feel unable to change or improve surrounding context, are unaware of surrounding opportunities, and

lack sense of control over external world. For the autonomy subscale, Ryff and Keyes defined high scorers as individuals who are self-determining and independent, able to resist social pressures to think and act in certain ways, regulate behavior from within, and evaluate self by personal standards. Individuals with lower scores on the autonomy subscale are concerned about the expectations and evaluations of others, rely on judgments of others to make important decisions, and conform to social pressures to think and act in certain ways. As stated previously, environmental mastery and autonomy are two of the three innate psychological needs identified as necessary for an individual's development and growth (Ryan & Deci, 2000).

Demographic Questionnaire

A demographic questionnaire developed for this current study included questions about age, gender, race/ethnicity, sport, years of experience in sport, whether or not the athlete is on a sport scholarship, and information regarding the effects of performance pressure on performance.

Procedure

The current study's procedure was two-part. In order to finalize the demographic questionnaire, the principal investigator conducted a 90-minute focus group with 9 club-level team tennis players (6 males and 3 females between the ages of 18-24 years old) at the University of Texas at Austin. The focus group participants discussed the proposed demographic questionnaire and provided interpretations and suggestions for the final questionnaire. The focus group was held in the clubhouse at the University of Texas at Austin Whittaker Tennis Complex. The principal investigator incorporated the feedback from the focus group and then finalized the demographic questionnaire prior to the study administration.

The second, and more substantial, part of the study consisted of administering the above described measures via paper-and-pencil to 111 University of Texas at Austin and Stanford University Division I varsity athletes. The principal investigator and/or co-investigator, Dr. Randa Ryan (Senior Associate Athletic Director at University of Texas at Austin), personally administered the consent form and measures to voluntary participants before/after team meetings or during athletes' study hall held in the Athletic Department. The principal investigator and co-investigator were available to answer questions or concerns prior to, during, and after the administration. In addition, the principal investigator's and advisor's (Dr. Chris McCarthy) contact information was provided to all participants via the consent form to answer any further questions or concerns about the study or the terms of consent after the administration. Further, all participants were informed that all information collected in the study would be kept confidential and participants' identities would remain completely anonymous to the principal investigator and co-investigator. Once the participants agreed to and signed the terms of consent, they began the questionnaire. The questionnaires were then completed and collected immediately in the presence of the investigators. In total, completing to questionnaire took between 20-30 minutes for the participants.

Recruitment of Participants

Recruitment of participants at the University of Texas at Austin and Stanford University occurred with the assistance of Dr. Ryan (Senior Associate Athletic Director at University of Texas at Austin) at University of Texas at Austin and through coach contacts at Stanford University. For the recruitment of varsity athletes at the University of Texas at Austin, the principal investigator worked with the Dr. Ryan to inform varsity athletes about the study during the athletes' study halls at the Athletic Department and if the athletes were interested in participating in the study, disseminated the relevant

materials. For the recruitment of varsity athletes at Stanford University, emails were sent by the principal investigator to the varsity sports' coaches informing them about the study, including the primary purpose and goals of the study, as well as the potential benefits and risks to the participants of the study. For the coaches that demonstrated an interest in participating in the study via their email response, the principal investigator scheduled a time to meet with the coaches and team/athletes in-person at Stanford University to further inform them about the study. For those athletes interested in participating in the study after they were informed about it, the questionnaires were administered. The questionnaires were administered either prior to or after scheduled team meetings or practices.

HYPOTHESES AND DATA ANALYSIS PLAN

Before presenting the hypotheses and primary analyses for the current study, the power analysis will be reviewed.

Power Analysis

According to Tabachnick and Fidell (2001) multiple regression analysis requires a large number of observations. A power analysis was conducted using G*Power, Version 3.0 (Faul, Erdfelder, Lang, & Buchner, 2007). The determined sample size of 77 was adequate to achieve 95% power to detect a medium effect size (.15) at a significance level of .05.

Hypothesis 1

Dispositional factors associated with choking-susceptibility (DFC-S) will account for a statistically significant amount of variance in the outcome variable, mindfulness (MAAS). DFC-S will be negatively related to mindfulness.

Analysis 1

To address Hypothesis 1, univariate and multiple regression analyses will be conducted. The outcome variable, mindfulness (MAAS), will be regressed on the predictor variables of self-consciousness (SC), trait anxiety (SAS-2), and coping style (CSIA) which comprise the DFC-S construct, both separately and together. Significance of the models will be assessed by reviewing the *t*- statistic and *F*- statistic. If the models are significant, then coefficient values will be evaluated for predictor variables' respective contribution to the models.

Hypothesis 2

Dispositional factors associated with choking-susceptibility (DFC-S) will account for a statistically significant amount of variance in the outcome variable, environmental mastery (as measured by the *Ryff Scales of Psychological Well-Being* subscale Environmental Mastery (PWB-EM)). DFC-S will be negatively related to environmental mastery (PWB-EM).

Analysis 2

To address Hypothesis 2, univariate and multiple regression analyses will be conducted. The outcome variable, environmental mastery (PWB-EM) will be regressed on the predictor variables of self-consciousness (SC), trait anxiety (SAS-2), and coping style (CSIA) which comprise the DFC-S construct, both separately and together. Significance of the models will be assessed by reviewing the *t*- statistic and *F*- statistic. If the models are significant, then coefficient values will be evaluated for predictor variables' respective contribution to the models.

Hypothesis 3

Dispositional factors associated with choking-susceptibility (DFC-S) will account for a statistically significant amount of variance in the outcome variable, autonomy (as measured by the *Ryff Scales of Psychological Well-Being* subscale Autonomy (PWB-A)). DFC-S will be negatively related to autonomy (PWB-A).

Analysis 3

To address Hypothesis 2, univariate and multiple regression analyses will be conducted. The outcome variable, autonomy (PWB-A) will be regressed on the predictor variables of self-consciousness (SC), trait anxiety (SAS-2), and coping style (CSIA) which comprise the DFC-S construct, both separately and together. Significance of the models will be assessed by reviewing the *t*- statistic and *F*- statistic. If the models are significant, then coefficient values will be evaluated for predictor variables' respective contribution to the models.

Hypothesis 4

Dispositional mindfulness (MAAS) will account for a statistically significant amount of variance in the outcome variable, environmental mastery (as measured by the *Ryff Scales of Psychological Well-Being* subscale Environmental Mastery (PWB-EM)). Mindfulness will be positively related to environmental mastery.

Analysis 4

To address Hypothesis 4, simple correlation and univariate regression analysis will be conducted. The outcome variable, environmental mastery (PWB-EM) will be regressed on the predictor variable of mindfulness (MAAS). A significant correlation will be determined by evaluating Pearson's product-moment correlation coefficient, *r*, and *t*-statistic.

Hypothesis 5

Dispositional mindfulness (MAAS) will account for a statistically significant amount of variance in the outcome variable, autonomy (as measured by the *Ryff Scales of Psychological Well-Being* subscale Autonomy (PWB-A)). Mindfulness will be positively related to autonomy.

Analysis 5

To address Hypothesis 5, simple correlation and univariate regression analysis will be conducted. The outcome variable, autonomy (PWB-A), will be regressed on the predictor variable of mindfulness (MAAS). A significant correlation will be determined by evaluating Pearson's product-moment correlation coefficient, *r*, and *t*-statistic.

Hypothesis 6

The psychological well-being dimension, environmental mastery (as measured by the *Ryff Scales of Psychological Well-Being* subscale Environmental Mastery (PWB-EM)), will be significantly and positively related to the psychological well-being dimension, autonomy (as measured by the *Ryff Scales of Psychological Well-Being* subscale Autonomy (PWB-A)).

Analysis 6

To address Hypothesis 6, simple correlation will be conducted. The relationship between environmental mastery and autonomy will be analyzed. A significant correlation will be determined by evaluating Pearson's product-moment correlation coefficient, *r*.

CONCLUSION

Chapter Three addressed the research methodology of the present study. The chapter began with statements of the problem and purpose for this dissertation. To briefly

reiterate, the consequences of choking not only involve performance decrements, but psychological distress; however, to date limited interventions exist to address this issue. As such, it is important to investigate variables and relationships that may provide insight into this complex construct, and thus, inform the development of more effective interventions. The variables of interest in the current study are dispositional factors associated with choking-susceptibility (self-consciousness, anxiety, and coping style), mindfulness, and dimensions of psychological well-being (environmental mastery and autonomy). The next section in this chapter detailed the three research questions examined in this dissertation. This section was followed by the methods section which included: descriptions of the participants (111 Division I college athletes from the University of Texas at Austin and Stanford University who participate in closed-skill sports); measures used in the study, including the *Self-Consciousness Scale* (SCS), *Sport Anxiety Scale-2* (SAS-2), *Coping Style Inventory for Athletes* (CSIA), *Mindfulness Awareness Attention Scale* (MAAS), *Ryff Scales of Psychological Well-Being* (PWB), and the Demographic Questionnaire; and procedure. Within the procedure section, the recruitment process for participants was discussed. The final section in Chapter Three presented the six hypotheses and data analysis plan. Chapter Four will focus on the results of the present study.

CHAPTER FOUR: RESULTS

OVERVIEW

The purpose of this quantitative correlational and regression research study was to examine whether relationships exist among dispositional factors associated with choking-susceptibility (self-consciousness, anxiety, and coping style), mindfulness and dimensions of psychological well-being, as well as to detail Division I athletes' self-reported experiences with performance pressure and choking. Specifically, this study sought to illuminate the relationships between these factors in an effort to determine the viability for the development of a mindfulness-based intervention for choking. In this quantitative correlational and regression design, the research questions associated with mindfulness and psychological well-being of the athletes were related to the independent variables of self-consciousness, trait anxiety, and coping style. For the purpose of the current study, the following questions were used to guide this quantitative correlational and regression study:

RQ1. Will trait self-consciousness, anxiety, and coping style (dispositional factors associated with choking-susceptibility (DFC-S)) predict degree of mindfulness (MAAS) in athletes?

RQ2. Will trait anxiety, self-consciousness, and coping style (DFC-S) predict psychological well-being in athletes (as measured by the *Ryff Scales of Psychological Well-Being* subscales Environmental Mastery (PWB-EM) and Autonomy (PWB-A)?

RQ3. Will level of dispositional mindfulness (MAAS) be significantly related to athletes' psychological well-being (as measured by the *Ryff Scales of*

Psychological Well-Being subscales Environmental Mastery (PWB-EM) and Autonomy (PWB-A)?

Research data were gathered using a paper-and-pencil questionnaire which included 97 Likert-type scale items, and 21 demographic items (see Appendix). The participants in the study were 111 Division I varsity athletes from the University of Texas at Austin and Stanford University enrolled during the 2009-2010 academic year. Participants were invited to participate in the study by either the principal investigator or the co-investigator. Participants were provided with information about the study and an informed consent statement. Participation in the study was voluntary, and participants were able to discontinue the survey at any point. Data was collected on-site and while participants were given an unlimited time period to complete the questionnaire, all participants finished the questionnaire in one-sitting which took approximately 20-30 minutes.

SAMPLE SIZE

The current study obtained a sample of 111 which surpassed the samples size of 77 needed to obtain significance in this study as calculated by power analysis (addressed in Chapter Three). After accounting for questionnaires with missing data[6], the actual number of eligible participants ultimately determined the sample size of 95, for a participation rate of 85.6% (95 eligible, 111 possible). This study utilized a nonprobability, purposive sampling method which provided the means with which to obtain results without the time, effort, and cost required for selecting a random sample

[6] Data with any missing values from the *Self-Consciousness Scale* (SCS), *Sport Anxiety Scale-2* (SAS-2), *Coping Style Inventory in Athletics* (CSIA), *Mindfulness Awareness Attention Scale* (MAAS), and *Ryff Scales of Psychological Well-Being*, Environmental Mastery and Autonomy subscales (PWB-EM, PWB-A, respectively) were excluded from analysis.

(StatSoft, Inc., 2010). The purposive sampling allowed for efficient surveying of the predefined population of interest, elite college athletes.

DATA PREPARATION AND PRELIMINARY ANALYSES

The collected data were recorded and coded into an Excel (2003) spreadsheet by the principal investigator. All items identified as reverse-scored were reversed accordingly. From there, the data was imported into SPSS 15 Gradpack for analysis. Prior to conducting the primary analyses using correlation and univariate and multiple regression analysis, the principal investigator evaluated the descriptive statistics (i.e., means, standard deviations, ranges, and minimum and maximum values). Skew and kurtosis of the data were also analyzed. Regarding the preliminary analysis for univariate and multiple regression as outlined by Brace, Kemp, and Snelgar (2006), linearity was assessed by inspecting scatterplots. The normality assumption for distributions of residuals was analyzed using a plot of residuals against the predicted values, histograms of standardized residuals, QQ-plots for standardized residuals and Kolmogorov-Smirnov tests for studentized residuals. Sensitivity analyses were used to determine the effect of outliers. And lastly, multicollinearity was assessed by evaluating the tolerance and variance inflation factor (VIF) statistics.

INTERNAL CONSISTENCY RELIABILITY

The five measures used in this study included the *Self-Consciousness Scale* (SCS; Fenigstein et al., 1975), *Sport Anxiety Scale-2* (SAS-2; Smith, Smoll, Cumming, & Grossbard, 2006), *Coping Style in Sport Inventory* (CSIA; Rawstorne, Anshel & Caputi, 1997), *Mindfulness Awareness Attention Scale* (MAAS; Brown & Ryan, 2003), and *Ryff Scales of Psychological Well-Being* (PWB; Ryff & Keyes, 1995). Despite the PWB being listed as one measure, it does not produce an overall psychological well-being composite

score. As such, each subscale of the PWB acts as its own validated and reliable scale. The two PWB subscales used in the current study were the Environmental Mastery (PWB-EM) and Autonomy (PWB-A) subscales of psychological well-being.

Prior to conducting any correlational or regression analyses in this study, reliability analyses were performed to assess the internal consistency reliability of the measures used in the present study utilizing Cronbach's alpha, α, statistic. A Cronbach's alpha reliability coefficient at or above .70 is indicative of consistent items in a measure (Simon, 2006). The resulting Cronbach's alpha, α, reliability coefficients ranged from *r*= .70 to *r* = .89 demonstrating adequate to strong reliability, respectively, as noted in Table 1.

Table 1: Internal Reliability Consistency for Measures

Measure	**Cronbach's Alpha (α)**	**Number of Items**
SCS	.82	23
SAS-2	.89	15
CSIA	.70	16
MAAS	.88	15
PWB-EM	.86	14
PWB-A	.80	14

CORRELATIONAL AND REGRESSION ANALYSES

A correlational study is a suitable line of inquiry when the primary purpose is "to determine relationships between variables" (Simon, 2006, p.43). The current study utilized correlation coefficient analysis to identify significant bivariate associations between variables. A correlational coefficient between -1.0 and +1.0 is used to determine whether a relationship exists among the variables of interest (Miles & Shevlin, 2007). A correlation coefficient near +1.0 indicates that the variables have a strong, positive linear

relationship where as one increases or decreases, so does the other. Conversely, a correlational coefficient of -1.0 indicates that the variables have a strong, negative linear relationship where as one increases or decreases, the other moves in an opposite direction. A correlational coefficient of 0 indicates no linear association among the variables of interest.

Univariate and multiple regression analysis is employed to account for (predict) the variance in the dependent variable, based on the linear combinations of interval, dichotomous, or dummy independent variables. Univariate and multiple regression can establish that independent variable(s) explain a proportion of the variance in a dependent variable at a significant level. Further, it can establish the relative predictive importance of the independent variables (by comparing beta weights for standardized independent variables) (Statnotes, 2010).

A *p* value of less than .05 was established to support rejecting the null hypotheses with a 95% confidence level. Results for the frequencies and percentages for selected demographic variables are reported in the first section of the chapter. Next, results addressing the primary research questions and corresponding hypotheses, which were tested using univariate and multiple linear regressions and correlational analysis, are reported.

DEMOGRAPHIC DATA

The frequencies for participants' demographic data were examined for the current study. Table 2 displays the frequency (*n*) counts and percentages for general demographics of participants. More than two-thirds (70%) of the participants were male, and slightly less than one-third (29%) were female. Participants' age ranged between 18 and 23 years-old with the majority of participants (38%) aged 19 years-old (*M*=19.36). Seventy-five percent (75%) identified as White/Caucasian, 15% as Black/African-

American, 5% as Other, 3% as Asian, and 1% as Hispanic/Latino(a). Slightly less than half (47%) of the participants reported to be in their 1st year of college, about one-quarter (26%) in their 2nd year, and the remaining quarter in their 3rd (21%) and 4th (5%) years of college.

Table 2: General Demographics of Participants (N =95)

Characteristic	**(n)**	**%**
Gender		
Male	67	69.8
Female	28	29.2
Age (years)		
18	17	17.9
19	36	37.9
20	22	23.4
21	14	14.7
22	5	5.3
23	1	1.1
Race/Ethnicity		
Asian	3	3.2
Native Hawaiian/Pacific Islander	0	0
Black/African-American	14	14.7
White/Caucasian	72	75.8
Hispanic/Latino(a)	1	1.1
Native American/Alaska Native	0	0
Other	5	5.3
Year in School		
1st	45	47.4
2nd	25	26.3
3rd	20	21.1
4th	5	5.3

Table 3 displays the frequency (*n*) counts and percentages for sports-related demographics. The overwhelming majority (76%) of participants identified as playing team sports and the remaining (24%) participants identified as playing individual sports. Participants in the current study were recruited from the following sports in descending order: rowing (31%), baseball (18%), basketball (14%), volleyball (14%), tennis (9%),

track and field (throws and pole vaulting) (9%), and softball (5.4%). Regarding player status, 61% identified as starters for their team while 36% identified as substitutes for their team.

Table 3: Sports-Related Demographics of Participants (N =95)

Characteristic	**(n)**	**%**
Competition-Type		
Individual	23	24.2
Team	72	75.8
Sport (N=111[7])		
Baseball	20	18.0
Basketball	16	14.4
Rowing	34	30.6
Softball	6	5.4
Tennis	10	9.0
Track & Field (only Throws and Pole vaulting)	10	9.0
Volleyball	15	13.5
Player Status		
Starter	58	61.1
Substitute	34	35.8
N/A	3	3.2

Demographics regarding participants' self-reported experiences with performance pressure are provided in Table 4. Participants were basically split between identifying performance pressure in competition as helpful (44%) and both helpful and unhelpful (53%), while only 2.1% identified performance pressure in competition as solely unhelpful. More than half (57%) of the participants reported losing in competition as a result of performance pressure while the remaining 42% reported never losing due to performance pressure. Participants who identified losing as a result of performance pressure considered the loss "choking under pressure" (37%) while 39% did not, and

[7] For the majority of participants, sport was not tabulated from the questionnaire. In an effort to further protect player confidentiality, the co-investigator kept a running tally of participants' sports separate from the questionnaires. Therefore, the sport category is based on the total participant number (111) because it is not possible to determine which missing cases coordinated with which sport.

24% of participants did not report anything (N/A). Participants reported the degree to which performance pressure/ "choking under pressure" was viewed as problematic ranging from "not very problematic" (25%) to "extremely problematic" (3%). Participants who identified losing as a result of performance pressure, reported that it only affected them a few times in their athletic history (38%), about once a season (16%), several times a season (15%), and almost every time they compete (6%). Participants who identified losing as a result of performance pressure, reported whether or not it affected how the participant viewed themselves as an athlete. Slightly less than one-third (31%) of the participants reported that it did not affect their view of themselves while 42% reported that it affected how they viewed themselves in the short-term (36%), long-term (6%), and the remaining 27% did not respond (N/A). Finally, participants who identified losing as a result of performance pressure reported whether or not their status on the team was affected. More than half (51%) of the participants reported that it did not affect their status on the team; however, 16% reported that it had a short-term effect, 6% reported a long-term effect, and 27% did not respond (N/A).

Table 4: Performance Pressure Demographics (N= 95)

Participants who self-reported:	**(n)**	**%**
Performance pressure in competition to be helpful, unhelpful, or both		
Helpful	42	44.2
Unhelpful	2	2.1
Both (helpful and unhelpful)	50	52.6
N/A	1	1.1
Losing due to performance pressure		
Yes	54	56.8
No	40	42.1
N/A	1	1.1
Considered loss "choking under pressure"		
Yes	35	36.8
No	37	38.9
N/A	23	24.2
Degree to which performance pressure has been problematic		
Not very problematic	24	25.3
Somewhat problematic	23	24.2
Problematic	18	19.0
Ever more problematic	3	3.2
Extremely problematic	3	3.2
N/A	24	25.3
Times performance pressure in competition affected them		
A few times	36	37.9
About once a season	15	15.8
Several times a season	14	14.7
Almost every time the participant competes	6	6.3
N/A	24	25.3
If performance pressure affected how the athlete viewed themselves		
No	29	30.5
Yes (short-term effect)	34	35.8
Yes (long-term effect)	6	6.3
N/A	26	27.4
If performance pressure affected the athlete's status on the team		
No	48	50.5
Yes (short-term effect)	15	15.8
Yes (long-term effect)	6	6.3
N/A	26	27.4

The sources of performance pressure that participants experience in competition are noted in Table 5. According to the statistics, participants attributed varying levels of

performance pressure to themselves, coach(es), team/teammates, and family. Per the literature on this topic, participants attributed the greatest source of performance pressure to themselves (a great deal (16%); much (26%); some (18%); a little (6%); and none (8%)); followed by their coach(es) (a great deal (11%); much (20%); some (26%); a little (20%); and none (6%); team/teammates (a great deal (8%); much (13%); some (33%); a little (19%); and none (12%); and finally, their families (a great deal (5%); much (6%); some (16%); a little (23%); and none (35%).

Table 5: Sources of Performance Pressure for Participants (N=95)

Pressure experienced from:	**(n)**	**%**
Self		
None	8	8.4
A Little	6	6.3
Some	17	17.9
Much	25	26.3
A Great Deal	15	15.8
N/A	24	25.3
Coach		
None	6	6.3
A Little	19	20.0
Some	25	26.3
Much	19	20.0
A Great Deal	10	10.5
N/A	16	16.8
Team/Teammates		
None	11	11.6
A Little	18	18.9
Some	31	32.6
Much	12	12.6
A Great Deal	8	8.4
N/A	15	15.8
Family		
None	33	34.7
A Little	22	23.2
Some	15	15.8
Much	6	6.3
A Great Deal	5	5.3
N/A	14	14.7

PRIMARY ANALYSES

In order to address the research questions of the current study, correlation and regression analyses were performed accordingly. For hypotheses 1-3, trait mindfulness total scores, psychological well-being (environmental mastery) total scores, and psychological well-being (autonomy) total scores were regressed linearly on trait self-

consciousness total scores, trait anxiety for sports total scores, and trait coping style for sports total scores. In addition, the predictive power of gender was analyzed for the first three hypotheses. For hypotheses 4-6, correlational analysis was used to determine the strength and direction of relationships between trait mindfulness and psychological well-being (environmental mastery) and (autonomy), respectively, as well as psychological well-being (environmental mastery) and (autonomy). The hypotheses were addressed by separate statistical analysis procedures and reported below.

Univariate and Multiple Regression Analysis

Hypothesis 1

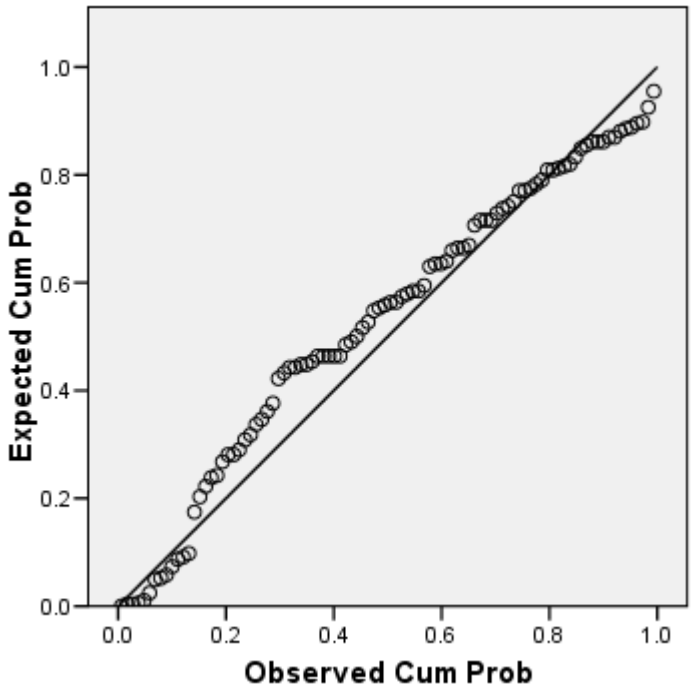
Hypothesis 1 proposed that the dispositional factors associated with choking susceptibility (self-consciousness, anxiety, and coping style) would be predictive of and negatively related to dispositional mindfulness.

Analysis for Hypothesis 1

Univariate and multivariate regression analyses were conducted using the three predictor variables (self-consciousness, anxiety, and coping style) and outcome variable, mindfulness. Mindfulness (as measured by the MAAS) was first regressed on self-consciousness (SCS), trait anxiety (SAS-2), and coping style (CSIA), separately. Results from the univariate regression analyses were not valid initially due to violations of the normality assumption, as depicted by the abnormal distribution of mindfulness, as displayed in Figure 2, and supported by the Kolmogorov-Smirnov test (one-sample *KS*-test = 1.28, $p = .077$)[8]. Therefore, mindfulness was transformed non-linearly in order to make the regression residuals comply with the normal distribution.

[8] Violations of the normality assumption are determined through a number of approaches, including assessing skew and kurtosis statistics, Kolmogorov-Smirnov test, and inspecting histograms of standardized residuals and QQ-plots for standardized residuals. While the distribution of residuals for mindfulness were not a gross violation of the normality assumption (and some may not even consider it a violation as it does

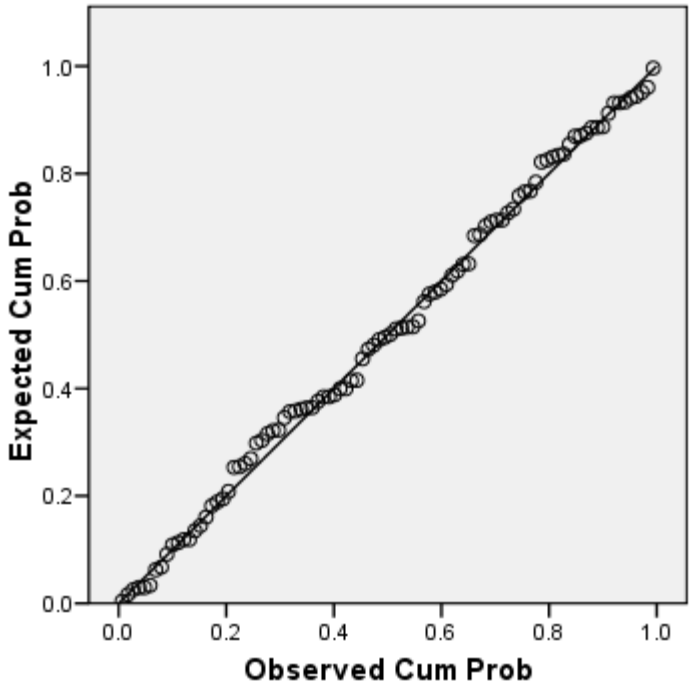
Figure 2: Abnormal QQ- Plot of Regression Standardized Residuals for Mindfulness



Univariate regression analyses were run for a second time with the transformed mindfulness variable. The normality assumption was assessed again. As seen in Figure 3, the distribution is normal, it satisfies the normality assumption, and is validated by the results from the Kolmogorov-Smirnov test (one-sample *KS*- test= .47, *p*=.980).

not meet the threshold for statistical significance at $p<.05$ on the Kolmogorov-Smirnov test), it was the choice of the principal investigator to use the transformed variable of mindfulness as it provided a more balanced distribution of residuals, and thus, better represented the data and results.

Figure 3: Normal QQ-Plot of Regression Standardized Residuals for Mindfulness



The univariate regression analyses with the transformed dependent variable, mindfulness, are reported first in this section. Results will be presented for each predictor variable in the following order; self-consciousness, anxiety, and coping variables. Then, the relationship between gender and mindfulness is considered. Lastly, a regression model including all choking-susceptibility predictor variables is reported.

A statistically significant relationship in the hypothesized direction was detected between self-consciousness and mindfulness, $t(93)= -2.62$, $p=.010$. As seen in Table 6, self-consciousness accounted for approximately 7% of the variance for mindfulness. Table 7 displays the regression coefficients for this model. Self-consciousness (SCS) is significantly ($p=.010$) negatively related to mindfulness indicating that high levels of self-consciousness correspond to low levels of mindfulness, and vice versa.

Table 6: Model Summary for Self-Consciousness Predicting Mindfulness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.26	.07	.06	108495.71

Predictors: (Constant),Self-Consciousness
Dependent Variable: Mindfulness (Transformed)

Table 7: Regression Coefficients for Self-Consciousness and Mindfulness

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***p***
(Constant)	417768.70	71924.54		5.81	<.001
Self-Consc.	-3147.48	1200.92	-.26	-2.62	.010

Dependent Variable: Mindfulness (Transformed)

A second statistically significant relationship in the hypothesized direction was found between anxiety and mindfulness, $t(93)= -4.06$, $p<.001$. The *R*-squared statistic indicated that anxiety accounted for approximately 15% of mindfulness variance as displayed in Table 8. Table 9 details the significant negative relationship ($p<.001$) between anxiety (SAS-2) and mindfulness which illustrates that high levels of anxiety correspond to low levels of mindfulness, and thus conversely, low levels of anxiety correspond to high levels of mindfulness.

Table 8: Model Summary for Anxiety Predicting Mindfulness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.39	.15	.14	103673.56

Predictors: (Constant),Anxiety
Dependent Variable: Mindfulness (Transformed)

Table 9: Regression Coefficients for Anxiety and Mindfulness

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***P***
(Constant)	388086.80	40005.46		9.70	<.001
Anxiety	-5168.96	1273.64	-.39	-4.05	<.001

Dependent Variable: Mindfulness (Transformed)

The third univariate regression analysis which assessed how well coping predicted mindfulness did not yield significant results. Table 10 displays the regression coefficients for this analysis, $t(93)= .37$, $p=.711$. Thus, the analysis is indicative of a weak relationship between the coping variable and mindfulness. Similarly, the univariate regression analysis results for gender and mindfulness also found a non-significant relationship as reported in Table 11, $t(93)= 1.63$, $p=.106$. Interestingly enough, gender was not predictive for level of mindfulness.

Table 10: Regression Coefficients for Coping and Mindfulness

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***P***
(Constant)	228894.70	13453.37		17.01	<.001
Coping	671.39	1807.90	-.04	.37	.711

Dependent Variable: Mindfulness (Transformed)

Table 11: Regression Coefficients for Gender and Mindfulness

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***P***
(Constant)	178974.40	34075.75		5.25	<.001
Gender	40673.03	24885.41	.17	1.63	.106

Dependent Variable: Mindfulness (Transformed)

In each one-factor model presented above, it was tested that if adding non-linear terms with the independent variables (excluding gender as it is a binary variable)

improved the predictive power. Due to the sample-size, square terms were focused on only. Uniformly, the square terms were found to be insignificant. This means that either the true shape of the relationship between the independent and dependent variables were identified or a more complex, non-linear relationship cannot be estimated accurately with the present study's sample size.

Finally, a multiple regression analysis was conducted to test the joint predictive power of self-consciousness, trait anxiety and coping style when predicting mindfulness. As seen in Table 12, the overall regression model is statistically significant, $F(3,92)= 6.64$, $p<.001$. This means that using choking-susceptibility predictors in a linear model is better than ignoring them completely. The *R*-squared statistic indicated that this model accounted for approximately 18% of the variance of mindfulness. As seen in Table 13, dispositional anxiety (SAS-2) is significantly ($p=.002$) negatively related to mindfulness indicating that high levels of anxiety correspond to low levels of mindfulness, and vice versa. Dispositional self-consciousness (SCS) and coping style (CSIA) did not yield significant relationships to mindfulness in this model.

Table 12: Regression Model for Mindfulness

Model	**Df**	**Sum of Squares**	**Mean Square**	***F***	***P***
Regression	3	211403132120.20	70467710706.73	6.643	.001
Residual	92	975958305148.04	10608242447.26		
Total	95	1187361437268.20			

Predictors: Self-Consciousness, Anxiety, Coping
Dependent Variable: Mindfulness (Transformed)

Table 13: Coefficients of Regression Model for Mindfulness

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***P***
(Constant)	452852.50	69949.48		6.47	<.001
Self-Consc.	-4881.12	1495.70	-.37	-3.26	.002
Anxiety	-1431.35	1367.70	-.12	-1.05	.298
Coping	2879.54	1748.24	. 16	1.65	.103

Dependent Variable: Mindfulness (Transformed)

Hypothesis 2

Hypothesis 2 proposed that the dispositional factors associated with choking susceptibility (self-consciousness, anxiety, and coping style) would be predictive of and negatively related to psychological well-being (environmental mastery).

Analysis for Hypothesis 2

The three predictor variables (self-consciousness, anxiety, and coping style) and the outcome variable, psychological well-being (environmental mastery) were the variables used in the Hypothesis 2 analysis. Psychological well-being (environmental mastery) (as measured by the PWB-EM) was first regressed separately on self-consciousness (SCS), trait anxiety (SAS-2), and coping (CSIA). Then, the predictive power of gender on psychological well-being (environmental mastery) was analyzed. The last regression analysis conducted for psychological well-being (environmental mastery) involved testing a model that included the three independent variables (self-consciousness, anxiety, and coping style) entered together as one block as opposed to being treated as three separate predictor variables.

A statistically significant relationship in the hypothesized direction was found between self-consciousness and psychological well-being (environmental mastery),

t(93)= -2.02, *p*=.046. As seen in Table 14, self-consciousness accounted for approximately 4% of the variance for mindfulness. Table 15 displays the regression coefficients for this model. Self-consciousness (SCS) is significantly (*p*=.046) negatively related to psychological well-being (environmental mastery) indicating that high levels of self-consciousness correspond to low levels of psychological well-being (environmental mastery), and the converse relationship is true as well.

Table 14: Model Summary for Self-Consciousness Predicting Psychological Well-Being (EM)

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.20	.04	.03	10.27

Predictors: (Constant),Self-Consciousness
Dependent Variable: Psychological Well-Being (Environmental Mastery)

Table 15: Regression Coefficients for Self-Consciousness and Psychological Well-Being (EM)

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***P***
(Constant)	70.92	6.81		10.42	<.001
Self-Consc.	-.23	.11	-.20	-2.02	.046

Dependent Variable: Psychological Well-Being (Environmental Mastery)

A second statistically significant relationship in the hypothesized direction was found between anxiety and psychological well-being (environmental mastery), *t*(93)= -2.69, *p*=.009. The *R*-squared statistic indicated that anxiety accounted for approximately 7% of the psychological well-being (environmental mastery) variance reported in Table 16. Table 17 details the significant negative relationship (*p*<.01) between anxiety (SAS-2) and psychological well-being (environmental mastery) which illustrates that high levels of anxiety correspond to low levels of psychological well-being (environmental mastery), and thus conversely, low levels of anxiety correspond to high levels of psychological well-being (environmental mastery).

Table 16: Model Summary for Anxiety Predicting Psychological Well-Being (EM)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.27	.07	.06	10.11

Predictors: (Constant),Anxiety
Dependent Variable: Psychological Well-Being (Environmental Mastery)

Table 17: Regression Coefficients for Anxiety and Psychological Well-Being (EM)

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***P***
(Constant)	67.45	3.90		17.30	.000
Anxiety	-.33	.12	-.27	-2.69	.009

Dependent Variable: Psychological Well-Being (Environmental Mastery)

The third univariate regression analysis assessed how well coping predicted psychological well-being (environmental mastery). This analysis did not yield significant results. Table 18 displays the regression coefficients for this analysis, $t(93)= 1.06$, $p=.294$. Thus, the analysis is indicative of a weak relationship between the predictor variable, coping, and psychological well-being (environmental mastery). Similarly, the univariate regression analysis results for gender and psychological well-being (environmental mastery) also found a non-significant relationship as reported in Table 19, $t(93)= 1.15$, $p=.250$. As found with the Hypothesis 1 analysis of gender, gender was not predictive for psychological well-being (environmental mastery).

Table 18: Regression Coefficients for Coping and Psychological Well-Being (EM)

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***P***
(Constant)	56.65	1.25		45.37	<.001
Coping	.18	.17	.11	1.06	.294

Dependent Variable: Psychological Well-Being (Environmental Mastery)

Table 19: Regression Coefficients for Gender and Psychological Well-Being (EM)

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***P***
(Constant)	53.87	3.20		16.82	<.001
Gender	2.69	2.34	.12	1.15	.250

Dependent Variable: Psychological Well-Being (Environmental Mastery)

In each one-factor model presented above, it was tested that if adding non-linear terms with the independent variables (excluding gender as it is a binary variable) improved the predictive power. Due to the sample-size, square terms were focused on only. Uniformly, the square terms were found to be insignificant. This means that either the true shape of the relationship between the independent and dependent variables were identified or a more complex, non-linear relationship cannot be estimated accurately with the present study's sample size.

Lastly, as seen in Table 20, the overall regression model is statistically significant, $F(3,92) = 4.05$, $p = .009$. The R-squared statistic indicated that this model accounts for approximately 12% of the variance of psychological well-being (environmental mastery), competence. As hypothesized and seen in Table 21, dispositional anxiety (SAS-2) is significantly ($p = .035$) negatively related to psychological well-being (environmental mastery) indicating that high levels of anxiety correspond to low levels of psychological well-being (environmental mastery), and vice versa. Coping style (CSIA) also yielded a significant ($p = .045$) relationship with psychological well-being (environmental mastery); however, it was a positive relationship which was opposite as hypothesized. The observed artifact may be due to the fact that the predictors, trait anxiety and coping style, are collinear. If they are measuring essentially the same factor, then the influence of this fact may manifest itself only through one of the regression coefficients. The other one

may well be of the opposite sign (Tabachnick & Fidell, 2007). Dispositional self-consciousness (SCS) did not yield a significant relationship to psychological well-being (environmental mastery) in this model.

Table 20: Regression Model for Psychological Well-Being (EM)

Model	**Df**	**Sum of Squares**	**Mean Square**	***F***	***P***
Regression	3	1207.08	461.59	4.05	.009
Residual	92	9130.58	117.66		
Total	95	10337.66			

Predictors: Self-Consciousness, Anxiety, Coping
Dependent Variable: Psychological Well-Being (Environmental Mastery)

Table 21: Coefficients of Regression Model for Psychological Well-Being (EM)

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***P***
(Constant)	74.47	6.77		11.01	<.001
Self-Consc.	-.15	.13	-.14	-1.16	.248
Anxiety	-.31	.15	-.25	-2.14	.035
Coping	.34	.17	.21	2.04	.045

Hypothesis 3

Hypothesis 3 proposed that the dispositional factors associated with choking susceptibility (self-consciousness, anxiety, and coping style) would be predictive of and negatively related to psychological well-being (autonomy).

Analysis for Hypothesis 3

The three independent variables (self-consciousness, anxiety, and coping style) were included in the regression analysis of psychological well-being (autonomy) both individually and together. Psychological well-being (autonomy) (as measured by the PWB-A) was first regressed separately on self-consciousness (SCS), trait anxiety (SAS-2), and coping (CSIA). Then, the analysis of gender in relation to psychological well-

being (autonomy) was conducted. The next and final regression analysis conducted with psychological well-being (autonomy) involved testing a model that included the three independent variables (self-consciousness, anxiety, and coping style) entered together as one block as opposed to being treated as three separate predictor variables.

A statistically significant relationship in the hypothesized direction was found between self-consciousness and psychological well-being (autonomy), $t(93)=-3.35$, $p=.001$. As seen in Table 22, self-consciousness accounted for approximately 11% of the variance for psychological well-being (autonomy). Table 23 displays the regression coefficients for this model. Self-consciousness (SCS) is significantly ($p=.001$) negatively related to psychological well-being (autonomy) indicating that high levels of self-consciousness correspond to low levels of psychological well-being (autonomy), and vice versa.

Table 22: Model Summary for Self-Consciousness Predicting Psychological Well-Being (A)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.33	.11	.10	8.99

Predictors: (Constant),Self-Consciousness
Dependent Variable: Psychological Well-Being (Autonomy)

Table 23: Regression Coefficients for Self-Consciousness and Psychological Well-Being (A)

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***P***
(Constant)	76.39	5.96		12.82	<.001
Self-Consc.	-.33	.10	-.333	-3.35	.001

Dependent Variable: Psychological Well-Being (Autonomy)

A second statistically significant relationship in the hypothesized direction was found between anxiety and psychological well-being (autonomy), $t(93)= -2.71$, $p=.008$. The *R*-squared statistic indicated that anxiety accounted for approximately 7% of the

psychological well-being (autonomy) variance reported in Table 24. Table 25 details the significant negative relationship (p=.008) between anxiety (SAS-2) and psychological well-being (autonomy) which illustrates that high levels of anxiety correspond to low levels of psychological well-being (autonomy), and thus conversely, low levels of anxiety correspond to high levels of psychological well-being (autonomy).

Table 24: Model Summary for Anxiety Predicting Psychological Well-Being (A)

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.27	.07	.06	9.16

Predictors: (Constant),Anxiety
Dependent Variable: Psychological Well-Being (Autonomy)

Table 25: Regression Coefficients for Anxiety and Psychological Well-Being (A)

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***P***
(Constant)	65.91	3.54		18.65	<.001
Anxiety	-.31	.11	-.27	-2.71	.008

Dependent Variable: Psychological Well-Being (Autonomy)

The third univariate regression analysis assessed how well coping predicted psychological well-being (autonomy). This analysis found non-significant results. Table 26 displays the regression coefficients for this analysis, $t(93)= 1.81$, p=.074. The analysis is therefore indicative of a weak relationship between the predictor variable, coping, and psychological well-being (autonomy). Coping was also tested in non-linear terms in univariate regressions, but again did not yield any significant results.

Table 26: Regression Coefficients for Coping and Psychological Well-Being (A)

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***P***
(Constant)	55.61	1.12		49.65	>.000
Coping	.27	.15	.18	1.81	.074

Dependent Variable: Psychological Well-Being (Autonomy)

The univariate regression analysis results for gender and psychological well-being (autonomy) yielded a significant relationship as reported in Table 28, $t(93)= 2.81$, $p=.006$. The *R*-squared statistic indicated that gender accounted for approximately 8% of the psychological well-being (autonomy) variance reported in Table 27. Table 28 details the significant positive relationship ($p=.006$) between gender and psychological well-being (autonomy). The relationship between gender and psychological well-being (autonomy) indicates that females display higher levels of psychological well-being (autonomy) than their male counterparts.

Table 27: Model Summary for Gender Predicting Psychological Well-Being (A)

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.27	.07	.06	9.16

Predictors: (Constant),Anxiety
Dependent Variable: Psychological Well-Being (Autonomy)

Table 28: Regression Coefficients for Gender and Psychological Well-Being (A)

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***p***
(Constant)	49.22	2.81		17.52	<.001
Gender	5.77	2.05	.28	2.81	.006

Dependent Variable: Psychological Well-Being (Autonomy)

In each one-factor model presented above, it was tested that if adding non-linear terms with the independent variables (excluding gender as it is a binary variable)

improved the predictive power. Due to the sample-size, square terms were focused on only. Uniformly, the square terms were found to be insignificant. This means that either the true shape of the relationship between the independent and dependent variables were identified or a more complex, non-linear relationship cannot be estimated accurately with the present study's sample size.

Lastly, a multiple regression model was tested using the three predictor variables (self-consciousness, anxiety, and coping) with the outcome variable, psychological well-being (autonomy). As seen in Table 29, the overall regression model is statistically significant, $F(3,92) = 8.42$, $p<.001$. The *R*-squared statistic indicated that this model accounts for approximately 22% of the variance of psychological well-being (autonomy). As hypothesized and seen in Table 30, dispositional self-consciousness (SCS) is significantly ($p=.004$) negatively related to psychological well-being (autonomy), indicating that high levels of self-consciousness correspond to low levels of psychological well-being (autonomy), and vice versa. Coping style (CSIA) also yielded a significant ($p=.001$) positive relationship with psychological well-being (autonomy). The positive relationship indicates higher scores of coping were related to higher levels of psychological well-being (A). Dispositional anxiety (SAS-2) did not yield a significant relationship to psychological well-being (autonomy).

Table 29: Regression Model for Psychological Well-Being (A)

Model	**Df**	**Sum of Squares**	**Mean Square**	***F***	***p***
Regression	3	1832.29	610.76	8.42	<.001
Residual	92	6671.04	72.51		
Total	95	8503.33			

Predictors: Self-Consciousness, Anxiety, Coping
Dependent Variable: Psychological Well-Being (Autonomy)

Table 30: Coefficients of Regression Model for Psychological Well-Being (A)

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***p***
(Constant)	80.84	5.78		13.98	<.001
Self-Consc.	-.34	.11	-.33	-2.99	.004
Anxiety	-.20	.12	-.18	-1.62	.109
Coping	.48	.15	.33	3.35	.001

Dependent Variable: Psychological Well-Being (Autonomy)

Correlational and Regression Analysis

Hypotheses 4-6 inquired about the relationships between dispositional mindfulness and psychological well-being (environmental mastery and autonomy). Table 31 displays the results of the correlation matrix. Pearson's product-moment correlation coefficient, *r*, is noted for both dependent variables (dispositional mindfulness, psychological well-being (environmental mastery and autonomy) and the independent variables (dispositional self-consciousness, dispositional anxiety, and coping style).

Table 31: Correlations Matrix, Means, and Standard Deviations for Variables

	1	**2**	**3**	**4**	**5**	**6**
1) Self-Consciousness	—	.52**	.30**	-.19	-.33**	-.20*
2) Anxiety		—	.25*	-.32**	-.27**	-.27**
3) Coping			—	.03	.18	.19
4) Mindfulness				—	.30**	.41**
5) Autonomy					—	.70**
6) Environmental Mastery						—
Mean	59.18	30.29	3.90	59.43	56.67	57.34
Standard Deviation	9.27	8.35	6.37	11.34	9.46	10.43

Notes: ** $p < 0.01$ (2-tailed)
* $p < 0.05$ (2-tailed)

Hypothesis 4

Hypothesis 4 purported that dispositional mindfulness and psychological well-being (environmental mastery) would be positively correlated. Therefore, higher or lower levels of dispositional mindfulness would correspond to higher or lower levels of psychological well-being (environmental mastery). In addition, it is hypothesized that dispositional mindfulness will be predictive of psychological well-being (environmental mastery).

Analysis for Hypothesis 4

As seen in Table 31, Pearson's product-moment correlation coefficients were examined to determine the relationships between dispositional mindfulness (MAAS) and psychological well-being (environmental mastery) (PWB-EM). Dispositional mindfulness revealed a significant positive relationship with psychological well-being (environmental mastery), $r(93)= .41$, $p<.001$) supporting Hypothesis 4. Further, a univariate regression analysis was conducted to investigate whether dispositional mindfulness is predictive of psychological well-being (environmental mastery). The analysis found that mindfulness is predictive of psychological well-being (environmental mastery), $t(93)= -4.92$, $p<.001$. As seen in Table 32, mindfulness accounted for approximately 21% of the variance of psychological well-being (environmental mastery). Table 33 displays the regression coefficients for the model. Mindfulness is significantly ($p<.001$) positively related to psychological well-being (environmental mastery) indicating that high levels of mindfulness correspond to high levels of psychological well-being (environmental mastery), and vice versa.

Table 32: Model Summary for Mindfulness Predicting Psychological Well-Being (EM)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.45	.21	.20	9.35

Predictors: (Constant),Mindfulness
Dependent Variable: Psychological Well-Being (Environmental Mastery)

Table 33: Regression Coefficients for Mindfulness and Psychological Well-Being (EM)

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***p***
(Constant)	47.57	2.20		21.58	<.001
Mindfulness	.0000422	>.00	.45	4.92	<.001

Dependent Variable: Psychological Well-Being (Environmental Mastery)

Hypothesis 5

Hypothesis 5 purported that dispositional mindfulness and psychological well-being (autonomy) would be positively correlated. Therefore, higher or lower levels of dispositional mindfulness would correspond to higher or lower levels of psychological well-being (autonomy).

Analysis for Hypothesis 5

As seen in Table 31, Pearson's product-moment correlation coefficients were computed in order to examine the relationships between dispositional mindfulness (MAAS) and psychological well-being (autonomy) (PWB-A) Dispositional mindfulness revealed a significant positive relationship with psychological well-being (autonomy), $r(93)= .30$, $p=.003$) supporting Hypothesis 5. Further, a univariate regression analysis was conducted to investigate whether dispositional mindfulness is predictive of psychological well-being (autonomy). The analysis found that mindfulness is predictive

of psychological well-being (autonomy), $t(93)= -3.65$, $p<.001$. As seen in Table 34, mindfulness accounted for approximately 12% of the variance of psychological well-being (autonomy). Table 35 displays the regression coefficients for the model. Mindfulness is significantly ($p<.001$) positively related to psychological well-being (autonomy) indicating that high levels of mindfulness correspond to high levels of psychological well-being (autonomy), and vice versa.

Table 34: Model Summary for Mindfulness Predicting Psychological Well-Being (A)

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.35	.12	.12	8.90

Predictors: (Constant),Mindfulness
Dependent Variable: Psychological Well-Being (Autonomy)

Table 35: Regression Coefficients for Mindfulness and Psychological Well-Being (A)

		Unstandardized Coefficients	Standardized Coefficients		
Model	***B***	***SE***	***β***	***T***	***p***
(Constant)	49.77	2.10		23.719	<.001
Mindfulness	.0000298	>.00	.35	3.648	<.001

Dependent Variable: Psychological Well-Being (Autonomy)

Hypothesis 6

Hypothesis 6 purported that psychological well-being (environmental mastery) would be positively correlated with psychological well-being (autonomy).

Analysis for Hypothesis 6

As seen in Table 31, Pearson's product-moment correlation coefficients were calculated to examine the relationships between psychological well-being (environmental mastery) (PWB-EM) and psychological well-being (autonomy) (PWB-A) Psychological well-being (environmental mastery) revealed a significant positive relationship with

psychological well-being (autonomy), $r(93)= .70$, $p<.001$) providing support for Hypothesis 6.

CONCLUSION

Chapter Four presented the results for the descriptive statistical data and the inferential analyses conducted to examine the hypotheses of the current study. Correlational analysis, as well as univariate and multiple linear regression analyses were performed to test the six hypotheses proposed in the current study. In general, the hypotheses were partially supported. Specifically, it was found that two of the dispositional choking-susceptibility factors, self-consciousness and anxiety, were significantly and negatively related to mindfulness and dimensions of psychological well-being, environmental mastery and autonomy. Further, both self-consciousness and anxiety individually were predictive of mindfulness and dimensions of psychological well-being. The third dispositional choking-susceptibility factor, coping style, that was analyzed in this dissertation yielded primarily insignificant findings indicating a weak to non-existent relationship between it and the outcome variables. In addition, the relationship between dispositional mindfulness and the dimensions of psychological well-being, environmental mastery and autonomy was assessed. The results of these analyses indicated that mindfulness and both dimensions of psychological well-being were significantly and positively related. The results will be further discussed and interpreted in Chapter Five.

CHAPTER FIVE: DISCUSSION

OVERVIEW

Sports are pervasive in our world today, existing for people of all different ages and skill-levels. With the ever-increasing popularity of sports, demands increase for athletes to perform to the best of their ability in competition. The emphasis on high performance, desired outcome, and personally-felt importance raises the level of pressure experienced by athletes. While some athletes rise under this pressure, other athletes experience it negatively, often with performance decrements and increased levels of anxiety and other types of emotional and behavioral distress, known as choking. The current study researched the relationships between factors associated with choking-susceptibility, mindfulness, and dimensions of psychological well-being.

In Chapter Five, the results of the study are addressed and interpreted. In addition, the chapter includes a restatement of the study's purpose, implications of the findings, and limitations of the study. Finally, recommendations for future research are discussed, as well as final comments regarding this dissertation.

RESTATEMENT OF PURPOSE

The purpose of the current study was to explore the relationships between dispositional factors (self-consciousness, anxiety, and approach coping style) associated with choking in competition, mindfulness, and dimensions of psychological well-being. This study endeavored to provide foundational knowledge regarding the ways in which these variables interact with one another as the consequences of choking are generally associated with unhealthier psychological functioning whereas mindfulness and psychological well-being represent healthier psychological functioning. Results from the

current study are intended to inform the development of effective interventions and treatments for athletes who experience performance anxiety and one of its effects, choking, in competition, as limited interventions currently exist.

DISCUSSION OF PRIMARY FINDINGS

In general, the hypotheses for the present study were partially supported which provides important information about the relationships between the variables of interest. For example, two out of the three predictor variables for choking-susceptibility (dispositional self-consciousness and trait anxiety) were consistently and significantly negatively related to the athlete's mindfulness and dimensions of psychological well-being (environmental mastery and autonomy). The specific results for each outcome variable (mindfulness and dimensions of psychological well-being (environmental mastery and autonomy)) are discussed below.

Mindfulness

The outcome variable, mindfulness, and its relationship to the dispositional factors associated with choking-susceptibility was the focus of Research Question 1 and correspondingly, Hypothesis 1. It was also the focus of Research Question 3 as the relationship of mindfulness to dimensions of psychological well-being was addressed in Hypotheses 4 and 5. Based on past research which found higher levels of mindfulness associated with healthier psychological functioning (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Brown et al., 2007; Coffey & Hartman, 2008; Kabat-Zinn, 2003; Masicampo & Baumeister, 2007), and specific to sports, athletes with higher levels of mindfulness experienced "flow state," or peak performance (opposite of choking) more frequently than athletes with lower scores (Kee & Wang, 2007; Jackson & Csikszentmihalyi, 1999; Nideffer, 1992), it was hypothesized in the present study that

athletes with lower levels of mindfulness would be more susceptible to experience choking in competition (as defined by endorsement of choking-susceptibility factors). This hypothesis was examined by regressing mindfulness on the dispositional choking-susceptible factors.

With the transformed outcome variable, mindfulness[9], univariate regressions analyses found that significant negative relationships existed between self-consciousness and mindfulness, as well as anxiety and mindfulness. The results indicate that athletes who experience higher dispositional self-consciousness and anxiety reported lower mindfulness, and conversely, athletes who experience lower self-consciousness and anxiety reported higher mindfulness. These findings support the hypothesized relationships put forth in this dissertation and found in past research (Mesagno, 2006; Wang, Marchant, Morris, & Gibbs, 2004), as presented in the literature review regarding the empirical and theoretical relationships between mindfulness and two out of the three dispositional factors associated with choking-susceptibility, self-consciousness and trait anxiety. Essentially, athletes that endorse higher levels of self-consciousness and anxiety also endorse lower levels of mindfulness. The third factor associated with choking-susceptibility, coping style, did not yield significant results in terms of its relationship to mindfulness. This result departed from past research findings (Kee & Wang 2007; Wang, Marchant, & Morris, 2004) that asserted an approach coping style was negatively related to mindfulness and performance outcome due to focus and attention being directed toward problem-solving in an effort to decrease stress intensity. In other words, the ability to automatically execute skills and possess mindfulness is disrupted as a result of trying to consciously control the high-pressure performance process. In addition,

[9] Mindfulness was transformed for the analyses reported and discussed in this dissertation, as initial analyses found a violation of the normality assumption due to a negative skew in the distribution. The negative skew indicated that there were fewer low mindfulness scores prior to the transformation.

analysis of the predictive power of gender to mindfulness resulted in non-significant results, meaning that mindfulness was not related to gender.

A multiple regression analysis was run to test the joint predictive power of self-consciousness, trait anxiety and coping style when predicting mindfulness. The regression model was statistically significant, and the model accounted for approximately 18% of the variance of mindfulness. Despite the high-level of significance for the overall model, only one of the regression coefficients, self-consciousness, was statistically significant. Trait anxiety which wielded the highest level of significance, and thus predictive power, in the univariate regression analysis is the weakest in the multiple regression model. These findings are important to include as they indicate that the predictors explain more together, than if they were not tested at all; however, the results may be indicative of collinearity, despite tolerance and variance inflation factor statistics indicating otherwise, which is an aspect of the study which may have been remedied with a larger sample size and is noted as a limitation.

The relationship of mindfulness to the outcome variables of psychological well-being (environmental mastery) and (autonomy) were assessed in the analyses of Hypotheses 4 and 5. It was hypothesized that mindfulness would be positively related and predictive of the dimensions of well-being selected. The results of the correlation analysis, as indicated by Pearson's product-moment correlation coefficients, found that mindfulness was significantly and positively related ($p<.001$, $p=.003$) to both dimensions of psychological well-being environmental mastery and autonomy, respectively. In addition, univariate regression analysis found that mindfulness significantly predicted both psychological well-being (environmental mastery) and (autonomy). The purpose and importance of these results is that they indicate that athletes who report higher levels of mindfulness also report higher levels of psychological well-being which is similar to past

research (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Brown et al., 2007; Coffey & Hartman, 2008; Kabat-Zinn, 2003; Masicampo & Baumeister, 2007). Further, possessing mindfulness is predictive of overall psychological well-being. Taken altogether, the results from the analyses involving mindfulness are encouraging. They not only indicate that factors associated with unhealthier psychological functioning are negatively related to mindfulness, but that mindfulness and psychological well-being are representative of healthier psychological functioning. Thus, establishing these relationships in the present study provide a strong premise for including mindfulness and psychological well-being in the dialogue regarding choking. Further investigations involving dispositional mindfulness and dispositional predictors of choking are warranted, and the development and testing of a mindfulness-intervention designed for choking-susceptible athletes is appropriate.

Psychological Well-Being

The other outcome variables of interest in this dissertation were two dimensions of psychological well-being, environmental mastery and autonomy. Ryan and Deci (2001) generally defined psychological well-being as encompassing optimal experience and functioning in an individual's life. Ryan and Deci, as well as another researcher, Ryff (1989), identified factors that comprised the construct of psychological well-being in their research; two of the factors identified were environmental mastery and autonomy. Environmental mastery is described as possessing the ability to effect change in the environment to meet the needs and desires of the individual. Autonomy is described as the pursuit of self-determination, individuality, and personal authority. These two dimensions of psychological well-being were selected for the present study because they have both been the dimensions of psychological well-being researched the most in past studies evaluating psychological well-being in sport. The relationships of these two

variables were investigated in terms of their relationships to the dispositional factors associated with choking-susceptibility and mindfulness. The following two sections discuss the results of the present study as they relate to environmental mastery and autonomy, respectively.

Environmental Mastery

Environmental mastery, also termed competence in the literature, and its relationships to the dispositional factors associated with choking-susceptibility was the focus of Research Question 2 and correspondingly, Hypothesis 2. It was also the focus of Research Question 3, as the relationship between environmental mastery and mindfulness was addressed in Hypotheses 4, and the relationship between environmental mastery and psychological well-being (autonomy) was considered in Hypothesis 6.

Research by Reinboth and Duda (2006) found that athletes with a negative perception of their own competence were generally preoccupied with the adequacy of their ability and were overly concerned with other individuals' activities and accomplishments. In a related vein, research by Gucciardi et al. (2010) found that the most common consequences of choking, as reported by athletes, is losing confidence and trust in one's abilities. As can be deduced from the reported research findings, a reciprocal theoretical relationship exists between environmental mastery and choking. Thus, the relevance of empirically researching this relationship is evident. It was hypothesized in the present study that athletes with lower levels of psychological well-being (environmental mastery) would be more susceptible to experience choking in competition (as defined by endorsement of choking-susceptibility factors). This hypothesis was examined by regressing psychological well-being (environmental mastery) on the dispositional choking-susceptible factors.

With the outcome variable, psychological well-being (environmental mastery), also referred to as competence, univariate regressions analyses found that significant negative relationships existed between self-consciousness and psychological well-being (environmental mastery), as well as anxiety and psychological well-being (environmental mastery). The results indicate that athletes who experience higher dispositional self-consciousness and anxiety, reported lower psychological well-being (environmental mastery), which is overall, representative of unhealthier psychological functioning. Conversely, athletes who experience lower self-consciousness and anxiety reported higher psychological well-being (environmental mastery), and thus healthier psychological functioning. Thus, the conclusion can be drawn that athletes who are experiencing self-consciousness and anxiety, are also likely experiencing feelings of incompetence. This finding is informative for researchers and practitioners alike, as addressing an athlete's self-consciousness and anxiety will likely have an effect on their feelings of competence. These findings support the hypothesized relationship put forth in this dissertation and found in past research (Gucciardi et al., 2010; Reinboth & Duda, 2006) as presented in the literature review discussing psychological well-being and sport.

The third factor associated with choking-susceptibility, coping style, did not yield significant results in terms of its relationship to psychological well-being (environmental mastery). This result did not support the hypothesized relationship. In addition, analysis of the predictive power of gender to psychological well-being (environmental mastery) resulted in non-significant results, meaning that psychological well-being (environmental mastery) was not related to gender.

A multiple regression analysis was run to test the joint predictive power of self-consciousness, trait anxiety and coping style when predicting psychological well-being (environmental mastery). The regression model was statistically significant. Despite the

level of significance for the overall model though, only two of the regression coefficients, anxiety and coping style, were significant. Self-consciousness, which was significant and therefore predictive of psychological well-being (environmental mastery) when analyzed with univariate regression, was the weakest coefficient in this multiple regression model. Similar to the multiple regression model with mindfulness, these findings are important to report, discuss, and include as they indicate that the predictors carry explanatory power together; however, the results may be indicative of multicollinearity, despite tolerance and variance inflation factor statistics indicating otherwise, which is an aspect of the study which may have been remedied with a larger sample size and is noted as a limitation.

The relationship of mindfulness to the outcome variable, psychological well-being (environmental mastery), was assessed in the analysis of Hypothesis 4 and discussed in the prior section (see Mindfulness under Discussion of Primary Findings). The relationship between psychological well-being (environmental mastery) and psychological well-being (autonomy) was assessed in the analysis of Hypothesis 6. It was hypothesized that psychological well-being (environmental mastery) would be significantly and positively related psychological well-being (autonomy). The results of the correlation analysis, as indicated by Pearson's product-moment correlation coefficients, found that psychological well-being (environmental mastery) indeed was significantly and positively related ($p<.01$) to psychological well-being (autonomy). The purpose and importance of these results is that they indicate that athletes who report higher levels of psychological well-being (environmental mastery) or competence similarly report higher levels of psychological well-being (autonomy). Thus, athletes endorsing higher levels of psychological well-being on one dimension are likely to endorse higher levels of psychological well-being on the other dimension as well, and

identify healthier psychological functioning in general. This finding is also indicative of the reliability of the measure used to assess psychological well-being in this dissertation. The results from the analyses involving psychological well-being (environmental mastery) are encouraging and further research is needed.

Autonomy

The second dimension of psychological well-being that was researched in the present study was autonomy. The relationship of psychological well-being (autonomy) and its relationships to the dispositional factors associated with choking-susceptibility was the focus of Research Question 2 and correspondingly, Hypothesis 3. It was also the focus of Research Question 3, as the relationship of autonomy and mindfulness was addressed in Hypothesis 5, and the relationship between autonomy and environmental mastery was considered in Hypothesis 6.

Past research examining psychological well-being and sport (Reinboth & Duda, 2006; Sarrazin, Guillet, & Cury, 2001) found that a negative relationship existed between perceptions of an ego-involving environment (an environment where athletes concern themselves with aspects of sport out of their control, like future advancement in competition, rewards, social approval, and aspects of performance pressure) and autonomy (as it is defined in the present study). As such, psychological well-being (autonomy) can be undermined based on elements inherent to sport. Further, Gucciardi et al.'s (2010) research, as discussed in the prior section on psychological well-being (environment), also pertains to psychological well-being (autonomy). When an athlete chokes and consequently loses confidence and trust in one's abilities, as well as experiences emotional distress, it only stands to reason that the athlete's pursuit of self-determination, individuality, and personal authority (autonomy) is negatively impacted. The present study empirically tested the relationship of psychological well-being

(autonomy) to the dispositional factors predicting choking. It was hypothesized that athletes with lower levels of psychological well-being (autonomy) would be more susceptible to experience choking in competition (as defined by endorsement of choking-susceptibility factors). This hypothesis was examined by regressing psychological well-being (autonomy) on the dispositional choking-susceptible factors.

With the outcome variable, psychological well-being (autonomy), univariate regressions analyses found that significant negative relationships existed between self-consciousness and psychological well-being (autonomy), as well as anxiety and psychological well-being (autonomy). The results indicate that athletes who experience higher dispositional self-consciousness and anxiety reported lower psychological well-being (autonomy), and conversely, athletes who experience lower self-consciousness and anxiety reported higher psychological well-being (autonomy). Thus, the claim that elements inherent in sport have the ability to undermine autonomy appears to be applicable based on the findings in the present study. These findings support the hypothesized relationship put forth in this dissertation and found in past research (Gucciardi et al., 2010; Sarrazin, Guillet, & Cury, 2001) as presented in the literature review discussing psychological well-being and sport.

For the third time, the third factor associated with choking-susceptibility, coping style, did not yield significant results in terms of its relationship to psychological well-being (autonomy). This result did not support the hypothesized relationship. While the result is somewhat surprising, it may be indicative of a number

The predictive power of gender to psychological well-being (autonomy) yielded a significant result indicating that gender was a significant predictor of psychological well-being (autonomy). Further, it was found that females exhibited higher psychological well-being (autonomy) than their male counterparts. This is an interesting result, as there

was no theoretical reason to expect any differences between gender and future investigations are needed to confirm this finding.

A multiple regression analysis was run to test the joint predictive power of self-consciousness, trait anxiety and coping style when predicting psychological well-being (autonomy). The regression model was statistically significant, and the model accounted for approximately 22% of the variance of psychological well-being (autonomy). Despite the level of significance for the overall model, only two of the regression coefficients, self-consciousness and coping style, were significant. Anxiety, which was significant and therefore predictive of psychological well-being (autonomy) when analyzed with univariate regression, was the weakest coefficient in this multiple regression model. Similar to the multiple regression model with mindfulness and psychological well-being (environmental mastery), these findings are important to include as they indicate that the predictors carry explanatory power together; however, the results may be indicative of multicollinearity, despite tolerance and variance inflation factor statistics indicating otherwise, which is an aspect of the study which may have been remedied with a larger sample size and is noted as a limitation.

The relationship of mindfulness to the outcome variable, psychological well-being (autonomy), was assessed in the analysis of Hypothesis 5 and discussed in the prior section (see Mindfulness under Discussion of Primary Findings). The relationship between psychological well-being (autonomy) and psychological well-being (environmental mastery) was assessed in the analysis of Hypothesis 6 and discussed in the prior section (see Environmental Mastery under Discussion of Primary Findings). The results from the analyses involving psychological well-being (autonomy) provided insight into the relationships between the dispositional choking-susceptibility factors,

mindfulness, and psychological well-being (environmental mastery). Further research examining these relationships is needed.

STUDY IMPLICATIONS

The present study was born from an interest to contribute to the dialogue and development of effective choking interventions. As a first step, this dissertation endeavored to establish foundational knowledge regarding dispositional factors associated with choking and their relationship to factors representing healthy psychological functioning, mindfulness and dimensions of psychological well-being. It was the intention of the principal investigator to empirically establish these relationships, which could then lead to the development of mindfulness-based choking interventions in future studies. The findings from the present research have both theoretical and practical implications as discussed below.

Regarding the theoretical implications, the results indeed provide new insight into the complex construct of choking. The relationships of interest in the present study had been theoretically surmised in the extant literature, but not empirically evaluated previously. Therefore, it is encouraging that the empirical findings from this dissertation partially support the theorized relationships. Two of the three choking-susceptibility dispositional factors, self-consciousness and anxiety, were found to be significantly and negatively related to mindfulness and dimensions of psychological well-being. Thus, elite athletes who endorse higher levels of self-consciousness and anxiety (which are predictive of choking) and potential markers of psychological unhealthiness are generally endorsing lower levels of mindfulness and psychological well-being, too. This information lends credence to the assertion that increasing athletes' overall mindfulness and psychological well-being may serve as a buffer from not only experiencing choking

in competition, but its psychologically damaging effects (Gucciardi et al, 2010; Hill et al., 2009).

The third dispositional factor associated with choking-susceptibility researched in this dissertation was coping style which yielded insignificant results in terms of its relationship to mindfulness and psychological well-being. The insignificant results were not in line with literature which asserted coping style as a predictor of choking (Wang et al., 2004), but nevertheless provide valuable information. As a predictor of choking, coping style is not as empirically well-established as self-consciousness and anxiety. Therefore, it may not wield as much explanatory power as the other two predictors in general. Specific to this dissertation, coping style may be a more ambiguous variable in terms of its relationship to mindfulness and psychological well-being. As described in the literature review, although approach coping is generally considered a more effective form of coping in the long-term, it can be ineffective in specific short-term situations, like high-pressure sports performance, as it has been related to disrupting attentional focus from competition toward problem-solving and decreasing stress intensity. However, based on the present study's findings, possessing an approach coping style may actually be positively related to the outcome variables of mindfulness and psychological well-being. On the other hand, perhaps a larger sample size in the present study would have resulted in significant results and confirmed approaching coping style as predictor of choking.

In terms of the practical implications, the findings from this dissertation may inform aspects of psychologists' work with elite athletes. To begin with, psychologists may want to administer the measures used in this dissertation to ascertain athletes' self-reported levels of self-consciousness, anxiety, coping style, mindfulness, and psychological well-being. This may provide psychologists with preliminary information

regarding the athletes' choking-susceptibility and conceptualization of healthy psychological factors which the psychologists can then either choose to address or not, depending on relevance. Further, whether or not susceptibility to choking is measured or self-reported by the elite athlete, it may be worthwhile for psychologists to employ techniques involving mindfulness in an effort to strengthen overall psychological well-being and healthy psychological functioning.

STUDY LIMITATIONS

As with any empirical research study, this study possessed various limitations. The most common limitation of survey related research, and the present study is no exception, is that the data collected is self-reported which can introduce measurement error due to participants' cognitive biases (Hanita, 2000) and social desirability biases. Regarding participants' cognitive biases, it is inherent with self-report measures that the variables of interest may not be measured the same way as a result of participants' perceptions and comprehension of these variables. To fully explore the constructs of interest, the current study would be strengthened by the incorporation of a structured or semi-structured interview. The inclusion of this type of assessment in future studies may more clearly delineate differences in participants' levels of self-consciousness, anxiety, coping style, mindfulness, and psychological well-being. Social desirability biases may be particularly relevant to the current study as the constructs examined may have been viewed as sensitive by the participants, and given the culture of Division I athletic competition which emphasizes a strength-based mentality, admitting growth edges or addressing weaknesses may not be acceptable. Therefore, by nature, self-report measures threaten a study's internal validity which is important to acknowledge as a limitation in the current study.

Another limitation in the current study is that the results are not generalizable to athletes of all skill-levels, competition-levels, and sports. The current study specifically examined elite athletes at Division I universities in the Western United States that participated in sports with utilized closed-skill sets. Therefore, generalizations must be limited to this population. Additionally, in terms of homogeneity of participants, this sample is likely to be over-representative of males and White/Caucasian participants. Despite the principal investigator's best efforts to survey a diverse sample, the majority of participants fell into the two above-mentioned categories.

The sampling method used in the current study, nonprobability purposive sampling, may be considered a limitation by some researchers. While nonprobability purposive sampling was the only viable sampling method for the current study due to the population of interest, it may be considered a limitation because the study did not obtain participants through randomization. Therefore, the sample may be considered biased. In addition, not all eligible members of the population were provided the chance to participate in the study for various reasons, including but not limited to not even being informed about the study if coaches or other athletic contacts did not want to participate from the outset; as a result, generalizations are limited as the sample does not fully represent the entire population.

The length of the questionnaire created another limitation in the study. This was evidenced by several participants failing to complete the full questionnaire and oral feedback provided to Dr. Ryan. The questionnaire requested that the participants responded to every relevant question/statement which totaled over 100 questions. In addition, the Demographic Questionnaire included space for participants to elaborate on their responses for several of the questions. However, the vast majority of participants did not use the free response space to explain their responses which the principal investigator

attributed to the total length of the questionnaire, and consequent survey fatigue. The original intention for including the free response space in the demographic questionnaire was to compliment the quantitative results in this dissertation with some qualitative analysis as well.

As detailed throughout the current study, both choking and mindfulness are in large part, attentional constructs. As such, it may be considered a limitation that the diagnosis of Attentional Deficit-Hyperactivity Disorder (ADHD) (which is primarily characterized by the co-existence of attentional problems and hyperactivity with these behaviors infrequently occurring alone) *(*DSM-IV, 1994) was not accounted for or measured as a factor in choking-susceptibility or dispositional mindfulness. However, provided the complexity of both the choking and mindfulness constructs, it was important to limit the scope of the present research. Future research may want to address the relatedness of ADHD with the constructs of interest in the current study.

Finally, it is worth noting that the present study's findings would have benefitted from a larger sample size. While the sample size in this dissertation unequivocally surpassed the number of observations needed to detect significance, a larger sample size may have remedied potential indications of multicollinearity within the multiple regression models and provided more power to the study to detect significant relationships that were not present with the current number of observations.

CONCLUSIONS AND FURTHER RECOMMENDATIONS FOR FUTURE RESEARCH

A construct as complex as choking, which incorporates cognitive, emotional and behavioral factors, presents researchers with a challenging, but rich research subject. In terms of this dissertation and the findings presented, there are many questions to be explored in future research. First and foremost, this dissertation was primarily exploratory in nature, and therefore studies replicating and expanding on the findings are

needed. While research supports the predictors of choking examined in this dissertation, a goal of future study would be to further examine the dispositional factors associated with choking-susceptibility (self-consciousness, anxiety, and approach coping style) and explore new predictors such as perfectionism and fear of failure as addressed in Gucciardi et al.'s (2010) study. In particular, it is important for research to address the significance of coping style and its role in choking-susceptibility as the present study's findings conflict with past research findings. In addition, it is advisable to expand upon the generalizability of the present research to athletes of different ages, competition- and skill-levels, and sports to encompass the broader population coping with choking under pressure.

Second, it would be important in future research to triangulate quantitative and qualitative data. Specifically, it would be interesting to determine whether athletes who are identified as choking-susceptible by the related measures, similarly self-report choking-susceptibility via a structured or semi-structured interview. Research incorporating multiple-methods would illuminate how self-aware athletes are in terms of their choking-susceptibility and complimenting quantitative with qualitative research would provide significant depth to the current understanding of choking-susceptibility. Further, it is not well-established in the current research how well data collection on choking and choking-susceptibility in the laboratory carries over to high and low performance pressure situations in the real-world. A goal for future study would be to track elite athletes performing in both high and low pressure real-world competitions, and through quantitative and qualitative analysis, determine where the laboratory and real-world findings differ.

Third, further research is necessary to explicate the role of mindfulness to both choking and peak-performance. For the interested researcher, research should be

undertaken that incorporates the findings from this dissertation and Kee and Wang's (2006) research on mindfulness and peak performance. Mindfulness by definition is an attentional construct, and as research is indicating both choking and peak performance are also largely attentionally-based constructs. As such, it would be worthwhile to determine the exact nature and relationship of mindfulness to these two separate, but related constructs.

Lastly, as was noted from the outset of this dissertation, a goal of the present research was to provide empirical evidence that would support the development of a mindfulness-based choking intervention. It is the hope of the principal investigator that the significant relationships detected between predictors of choking-susceptibility, mindfulness, and dimensions of psychological well-being will indeed inform the development and preliminary examination of a mindfulness-based choking intervention in future studies. With the ever-increasing pressures placed on athletes to perform well in competition, it is necessary to provide tools for them to successfully perform and cope with the demands.

FINAL COMMENTS

The negative effects of choking have been well-documented and researchers within this area have called for further research investigating variables involved in this comprehensive construct. This dissertation examined the relationships between dispositional factors associated with choking-susceptibility (self-consciousness, anxiety, and coping style) and factors representing healthier psychological functioning, mindfulness and dimensions of psychological well-being. The present research identified significant, negative relationships between choking-susceptibility factors, mindfulness and psychological well-being. The findings from this dissertation are aptly timed as recent research (Gucciardi et al., 2010; Hill, Hanton, Fleming, & Matthews, 2009) has

further supported claims that choking is psychologically damaging to athletes, in terms of athletes losing confidence, trust in their abilities, and experiencing emotional distress. As such, effective interventions to inoculate athletes against choking are needed, and given the findings of the current dissertation, the development of a mindfulness-based choking intervention may be the next step.

APPENDIX A: IRB APPROVAL

OFFICE OF RESEARCH SUPPORT

THE UNIVERSITY OF TEXAS AT AUSTIN

P.O. Box 7426, Austin, Texas 78713 (512) 471-8871 -FAX (512 471-8873)
North Office Building A, Suite 5.200 (Mail code A3200)

FWA # 00002030

Date: **12/18/09**

PI(s): **Lauren T Melendres** Department & Mail Code: **EDUC PSYCHOL DEPT**
Randa C Ryan **INTERCOLL ATHL-WOMEN**

Title: **Choking Under Pressure in Sports: An Examination of the Relationship between Choking-Susceptibility Dispositional Factors, Mindfulness, and Psychological Well-Being in Athletes**

IRB APPROVAL – IRB Protocol # **2009-09-0083**

Dear: **Lauren T Melendres Randa C Ryan**

In accordance with Federal Regulations for review of research protocols, the Institutional Review Board has reviewed the above referenced protocol and found that it met approval under an Expedited category for the following period of time: **12/18/2009 - 12/17/2010** . *(expires 12am [midnight] of this date.)*

Expedited category of approval:

☐ **(1)** Clinical studies of drugs and medical devices only when condition (a) or (b) is met. (a) Research on drugs for which an investigational new drug application (21 CFR Part 312) is not required. (Note: Research on marketed drugs that significantly increases the risks or decreases the acceptability of the risks associated with the use of the product is not eligible for expedited review). (b) Research on medical devices for which (i) an investigational device exemption application (21 CFR Part 812) is not required; or (ii) the medical device is cleared/approved for marketing and the medical device is being used in accordance with its cleared/approved labeling.

☐ **(2)** Collection of blood samples by finger stick, heel stick, ear stick, or venipuncture as follows: (a) from healthy, non-pregnant adults who weigh at least 110 pounds. For these subjects, the amounts drawn may not exceed 550 ml in an 8 week period and collection may not occur more frequently than 2 times per week; or (b) from other adults and children2, considering the age, weight, and health of the subjects, the collection procedure, the amount of blood to be collected, and the frequency with which it will be collected. For these subjects, the amount drawn may not exceed the lesser of 50 ml or 3 ml per kg in an 8 week period and collection may not occur more frequently than 2 times per week.

☐ **3)** Prospective collection of biological specimens for research purposes by Non-invasive means. Examples:

(a) hair and nail clippings in a non-disfiguring manner;
(b) deciduous teeth at time of exfoliation or if routine patient care indicates a need for extraction;
(c) permanent teeth if routine patient care indicates a need for extraction;
(d) excreta and external secretions (including sweat);
(e) uncannulated saliva collected either in an un-stimulated fashion or stimulated by chewing gumbase or wax or by applying a dilute citric solution to the tongue;
(f) placenta removed at delivery;
(g) amniotic fluid obtained at the time of rupture of the membrane prior to or during labor;

(h) supra- and subgingival dental plaque and calculus, provided the collection procedure is not more invasive than routine prophylactic scaling of the teeth and the Process is accomplished in accordance with accepted prophylactic techniques;
(i) mucosal and skin cells collected by buccal scraping or swab, skin swab, or mouth washings;
(j) sputum collected after saline mist nebulization.

☐ **(4)** Collection of data through noninvasive procedures (not involving general anesthesia or sedation) routinely employed in clinical practice, excluding procedures involving x-rays or microwaves. Where medical devices are employed, they must be cleared/approved for marketing. (Studies intended to evaluate the safety and effectiveness of the medical device are not generally eligible for expedited review, including studies of cleared medical devices for new indications). Examples:

(a) physical sensors that are applied either to the surface of the body or at a distance and do not involve input of significant amounts of energy into the subject or an invasion of the subject's privacy;
(b) weighing or testing sensory acuity;
(c) magnetic resonance imaging;
(d) electrocardiography, electroencephalography, thermography, detection of naturally occurring radioactivity, electroretinography, ultrasound, diagnostic infrared imaging, doppler blood flow, and echocardiography;
(e) moderate exercise, muscular strength testing, body composition assessment, and flexibility testing where appropriate given the age, weight, and health of the individual.

☐ **(5)** Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for non-research purposes (such as medical treatment or diagnosis). (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(4). This listing refers only to research that is not exempt).

☐ **(6)** Collection of data from voice, video, digital, or image recordings made for research purposes.

☒ **(7)** Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b)(3). This listing refers only to research that is not exempt).

☒ **Please use the attached approved informed consent**

☐ **You have been granted Waiver of Documentation of Consent**
According to 45 CFR 46.117, an IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects if it finds either:

☐ The research presents no more than minimal risk
AND
☐ The research involves procedures that do not require written consent when performed outside of a research setting
<OR>
☐ The principal risks are those associated with a breach of confidentiality concerning the subject's participation in the research
AND
☐ The consent document is the only record linking the subject with the research
AND
☐ This study is not FDA regulated (45 CFR 46.117)
AND
☐ Each participant will be asked whether the participant wishes documentation linking the participant with the research, and the participants wishes will govern.

You have been granted Waiver of Informed Consent
According to 45 CFR 46.116(d), an IRB may waive or alter some or all of the requirements for Informed consent if:

☐ The research could not practicably be carried out without the waiver; and
☐ Whenever appropriate, the subjects will be provided with additional pertinent information they have participated in the study.
☐ This study is not FDA regulated (45 CFR 46.117)

RESPONSIBILITIES OF PRINCIPAL INVESTIGATOR FOR ONGOING PROTOCOLS:

(1) Report **immediately** to the IRB any unanticipated problems.

(2) Proposed changes in approved research during the period for which IRB approval cannot be initiated without IRB review and approval, except when necessary to eliminate apparent immediate hazards to the participant. Changes in approved research initiated without IRB review and approval initiated to eliminate apparent immediate hazards to the participant must be promptly reported to the IRB, and reviewed under the unanticipated problems policy to determine whether the change was consistent with ensuring the participants continued welfare.

(3) Report any significant findings that become known in the course of the research that might affect the willingness of subjects to continue to take part.

(4) Insure that only persons formally approved by the IRB enroll subjects.

(5) Use **only** a currently approved consent form (remember approval periods are for 12 months or less).

(6) **Protect the confidentiality of all persons and personally identifiable data, and train your staff and collaborators on policies and procedures for ensuring the privacy and confidentiality of participants and information.**

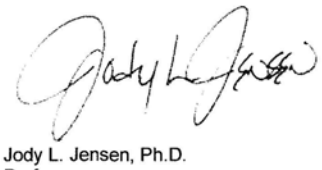
(7) Submit for review and approval by the IRB all modifications to the protocol or consent form(s) prior to the implementation of the change.

(8) Submit a **Continuing Review Report** for continuing review by the IRB. Federal regulations require **IRB review of on-going projects no less than once a year** (a Continuing Review Report form and a reminder letter will be sent to you 2 months before your expiration date). Please note however, that if you do not receive a reminder from this office about your upcoming continuing review, it is the primary responsibility of the PI not to exceed the expiration date in collection of any information. Finally, it is the responsibility of the PI to submit the Continuing Review Report before the expiration period.

(9) Notify the IRB when the study has been completed and complete the Final Report Form.

(10) Please help us help you by including the above protocol number on all future correspondence relating to this protocol.

Sincerely,



Jody L. Jensen, Ph.D.
Professor
Chair, Institutional Review Board

APPENDIX B: INFORMED CONSENT

IRB APPROVED ON: 12/18/2009 EXPIRES ON: 12/17/2010
IRB Protocol #2009-09-0083

Title: An Examination of Dispositional Factors Related to Athletic Performance
Conducted By: Lauren Melendres, M.A.
Of The University of Texas at Austin: Department of Educational Psychology
Telephone: (xxx) xxx-xxxx

Dear Participant:

You are being asked to participate in a research study. This form provides you with information about the study. The person in charge of this research will also describe this study to you and answer all of your questions. Please read the information below and ask any questions you might have before deciding whether or not to take part. Your participation is entirely voluntary. You can refuse to participate without penalty or loss of benefits to which you are otherwise entitled. You can stop your participation at any time and your refusal will not impact current or future relationships with UT Austin or participating sites. To do so simply tell the researcher you wish to stop participation. The researcher will provide you with a copy of this consent for your records.

The purpose of this study is to better understand the relationship between dispositional factors (self-consciousness, anxiety, and coping style) that have been associated with greater sensitivity to performance pressure, mindfulness, and psychological well-being. As a varsity member of an intercollegiate athletic team I am requesting your participation in a study that is concerned with you r experiences as a student-athlete. Your openness and cooperation are extremely important and greatly appreciated. The results of this study are expected to yield a better understanding of how the competitive and pressure-filled environment in sports affects athletes.

You should not participate in this study if you are under the age of 18. If you agree to participate you will be asked to complete a paper-and-pencil survey about your experiences as an intercollegiate student-athlete. A minimum of 80 participants will be completing this survey. Participation in this study will only require you to answer questions one time, during which you will complete a survey. Participation in this study will only require you to be login online one time, during which you will complete the survey. Your participation will last for about 20-25 minutes. A brief explanation of the project and reading of the informed consent document will take roughly 5 minutes. The questionnaire you will be given will take about 15-20 minutes to complete.

The risks associated with participating in this study are minimal and no greater than everyday life; however, some questions may be considered sensitive. Participating in this study is completely voluntary and there is no compensation or direct benefits for your

participation. You may choose not to take part in the study or to stop participating at any time, for any reason, without penalty or negative consequences. You can skip any questions that you do not wish to answer. Your choice of whether or not to participate will have no impact on you as a student-athlete in any way. There will be no records identifying participants. Your name will not appear on the questionnaire, and you may be assured of complete confidentiality. The published results will not refer to any individual or institution and all discussions will be based on group data.

The data resulting from your participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate you with it, or with your participation in any study.

The records of this study will be stored securely and kept confidential. Authorized persons from The University of Texas at Austin, members of the Institutional Review Board have the legal right to review your research records and will protect the confidentiality of those records to the extent permitted by law. All publications will exclude any information that will make it possible to identify you as a subject. Throughout the study, the researchers will notify you of new information that may become available and that might affect your decision to remain in the study.

You are encouraged to ask questions at any time before or during this investigation. The procedures utilized in this investigation have been reviewed and approved by The University of Texas at Austin. If you have any questions, please contact Lauren Melendres at laurentm@mail.utexas.edu or (xxx) xxx-xxxx or Dr. Chris McCarthy at chris.mccarthy@mail.utexas.edu or (512) 471-0368.

If you would like to obtain information about the research study, have questions, concerns, complaints or wish to discuss problems about a research study with someone unaffiliated with the study, please contact the IRB Office at (512) 471-8871 of Jody Jensen, Ph.D., Chair, The University of Texas at Austin Institutional Review Board for the Protection of Human Subjects at (512) 232-2685. Anonymity, if desired, will be protected to the extent possible. As an alternative method of contact, an email may be sent to orsc@uts.cc.utexas.edum or a letter sent to IRB Administrator, P.O. Box 7426, Mail Code A 3200, Austin, TX 78713.

You will be given a copy of this information to keep for your records.

Sincerely,

Lauren Melendres
E-mail: laurentm@mail.utexas.edu
Phone: (xxx) xxx-xxxx
Enclosures

Dr. Christopher McCarthy
Phone: (512) 471-0368
Fax: (512) 475-7641
E-Mail: chris.mccarthy@mail.utexas.edu

Statement of Consent:
I have read the above information and have sufficient information to make a decision about participating in this study. I consent to participate in the study.

Signature:_____ Date:_____

_____ Date:_____
Signature of Person Obtaining Consent

Signature of Investigator:_____ Date:_____

APPENDIX C: SELF-CONSCIOUSNESS SCALE

There are no wrong or right answers. Do not spend too much time on one statement but give the answer which seems to describe how you *generally* feel. Please answer every statement as truthfully as you can.

Extremely Uncharacteristic 1	Somewhat Uncharacteristic 2	Somewhat Characteristic 3	Extremely Characteristic 4

1.	I'm always trying to figure myself out.	1 2 3 4
2.	I'm concerned about my style of doing things.	1 2 3 4
3.	Generally, I'm not very aware of myself.	1 2 3 4
4.	It takes me time to overcome my shyness in a new situation.	1 2 3 4
5.	I reflect about myself a lot.	1 2 3 4
6.	I'm concerned about the way I present myself.	1 2 3 4
7.	I'm often the subject of my own fantasies.	1 2 3 4
8.	I have trouble working when someone is watching me.	1 2 3 4
9.	I never scrutinize myself.	1 2 3 4
10.	I get embarrassed very easily.	1 2 3 4
11.	I'm self-conscious about the way I look.	1 2 3 4
12.	I don't find it hard to talk with strangers.	1 2 3 4
13.	I'm generally attentive to my inner feelings.	1 2 3 4
14.	I usually worry about making a good impression.	1 2 3 4
15.	I'm constantly examining my motives.	1 2 3 4
16.	I feel anxious when I speak in front of a group.	1 2 3 4
17.	One of the last things I do before I leave my house is look in the mirror.	1 2 3 4
18.	I sometimes have the feeling that I'm off somewhere watching myself.	1 2 3 4
19.	I'm concerned about what people think of me.	1 2 3 4
20.	I'm alert to changes in my mood.	1 2 3 4
21.	I'm usually aware of my appearance.	1 2 3 4
22.	I'm aware of the way my mind works when I work through a problem.	1 2 3 4
23.	Large groups make me nervous.	1 2 3 4

APPENDIX D: SPORT ANXIETY SCALE-2

Many athletes get tense or nervous before or during games, meets, or matches. This happens even to pro athletes. Please read each question. Then, circle the number that says how you USUALLY feel before or while you compete in sports. There are no wrong or right answers. Please answer every statement as truthfully as you can.

Not At All	Somewhat	Moderately So	Very Much So
1	2	3	4

Before or while I compete in sports:

1.	It is hard to concentrate on the game.	1	2	3	4
2.	My body feels tense.	1	2	3	4
3.	I worry that I will not play well.	1	2	3	4
4.	It is hard for me to focus on what I am supposed to do.	1	2	3	4
5.	I worry that I will let others down.	1	2	3	4
6.	I feel tense in my stomach.	1	2	3	4
7.	I lose focus on the game.	1	2	3	4
8.	I worry that I will not play my best.	1	2	3	4
9.	I worry that I will play badly.	1	2	3	4
10.	My muscles feel shaky.	1	2	3	4
11.	I worry that I will mess up during the game.	1	2	3	4
12.	My stomach feels upset.	1	2	3	4
13.	I cannot think clearly during the game.	1	2	3	4
14.	My muscles feel tight because I am nervous.	1	2	3	4
15.	I have a hard time focusing on what my coach tells me to do.	1	2	3	4

APPENDIX E: COPING STYLE INVENTORY FOR ATHLETES

This survey consists of questions relating to you *typical* reactions to stressful events (i.e. making a mistake during performing) that you have experienced in sports competition. Circle the number that best describes how much each statement reflects your *immediate reaction* to the stressful experience (stressor). There are no wrong or right answers so please be as candid as possible.

Very Untrue	Somewhat Untrue	Undecided	Somewhat True	Very True
1	2	3	4	5

1.	I thought I was just having a bad day, so it did not upset me.	1	2	3	4	5
2.	I concentrated on what I had to do next.	1	2	3	4	5
3.	I immediately turned my attention to the next physical task at hand.	1	2	3	4	5
4.	I became very critical of my performance.	1	2	3	4	5
5.	I did not take the unpleasant experience very seriously.	1	2	3	4	5
6.	I quickly became more enthusiastic or aggressive for the purpose of confronting the stressor.	1	2	3	4	5
7.	I quickly became more enthusiastic or aggressive for the purpose of improving my performance.	1	2	3	4	5
8.	I tried to forget about the unpleasant experience.	1	2	3	4	5
9.	I immediately became angry, but then quickly continued playing without thinking about it.	1	2	3	4	5
10.	I thought about the unpleasant experience for quite some time during the competition/match/event.	1	2	3	4	5
11.	I tried to analyze the reasons for the unpleasant experience.	1	2	3	4	5
12.	I felt like talking to another person about the unpleasant experiences.	1	2	3	4	5
13.	I felt like giving up.	1	2	3	4	5
14.	I became more 'psyched up' or excited after the unpleasant experience.	1	2	3	4	5
15.	I did not let the unpleasant experience bother me. I reasoned that it was just part of the game.	1	2	3	4	5
16.	I tried to learn from the unpleasant experience.	1	2	3	4	5

APPENDIX F: MINDFUL ATTENTION AWARENESS SCALE

Please indicate how frequently you have the experience described in each of the following statements.

Almost Always	Very Often	Frequently	Sometimes	Rarely	Almost Never
1	2	3	4	5	6

1.	I could be experiencing some emotion and not be conscious of it until some time later.	1	2	3	4	5	6
2.	I break or spill things because of carelessness, not paying attention, or thinking of something else.	1	2	3	4	5	6
3.	I find it difficult to stay focused on what's happening in the present.	1	2	3	4	5	6
4.	I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.	1	2	3	4	5	6
5.	I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	1	2	3	4	5	6
6.	I forget a person's name almost as soon as I've been told it for the first time.	1	2	3	4	5	6
7.	It seems I am "running on automatic" without much awareness of what I'm doing.	1	2	3	4	5	6
8.	I rush through activities without being really attentive to them.	1	2	3	4	5	6
9.	I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there.	1	2	3	4	5	6
10.	I do jobs or tasks automatically, without being aware of what I'm doing.	1	2	3	4	5	6
11.	I find myself listening to someone with one ear, doing something else at the same time.	1	2	3	4	5	6
12.	I drive places on "automatic pilot" and then wonder why I went there.	1	2	3	4	5	6
13.	I find myself preoccupied with the future or the past.	1	2	3	4	5	6
14.	I find myself doing things without paying attention.	1	2	3	4	5	6
15.	I snack without being aware that I'm eating.	1	2	3	4	5	6

APPENDIX G: RYFF SCALES OF PSYCHOLOGICAL WELL-BEING

The following set of questions deals with how you feel about yourself and your life. Please remember that there are no right or wrong answers.

Strongly Disagree	Disagree Somewhat	Disagree Slightly	Agree Slightly	Agree Somewhat	Strongly Agree
1	2	3	4	5	6

1.	Sometimes I change the way I act or think to be more like those around me.	1	2	3	4	5	6
2.	In general, I feel I am in charge of the situation in which I live.	1	2	3	4	5	6
3.	I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people.	1	2	3	4	5	6
4.	The demands of everyday life often get me down.	1	2	3	4	5	6
5.	My decisions are not usually influenced by what everyone else is doing.	1	2	3	4	5	6
6.	I do not fit very well with the people and the community around me.	1	2	3	4	5	6
7.	I tend to worry about what other people think of me.	1	2	3	4	5	6
8.	I am quite good at managing the many responsibilities of my daily life.	1	2	3	4	5	6
9.	Being happy with myself is more important to me than having others approve of me.	1	2	3	4	5	6
10.	I often feel overwhelmed by my responsibilities.	1	2	3	4	5	6
11.	I tend to be influenced by people with strong opinions.	1	2	3	4	5	6
12.	If I were unhappy with my living situation, I would take effective steps to change it.	1	2	3	4	5	6
13.	People rarely talk to me into doing things I don't want to do.	1	2	3	4	5	6
14.	I generally do a good job of taking care of my personal finances and affairs.	1	2	3	4	5	6
15.	It is more important to me to "fit in" with others than to stand alone on my principles.	1	2	3	4	5	6
16.	I find it stressful that I can't keep up with all of the things I have to do each day.	1	2	3	4	5	6
17.	I have confidence in my opinions, even if they are contrary to the general consensus.	1	2	3	4	5	6
18.	I am good at juggling my time so that I can fit everything in that needs to be done.	1	2	3	4	5	6

Ryff Scales of Psychological Well-Being (Continued)

The following set of questions deals with how you feel about yourself and your life. Please remember that there are no right or wrong answers.

Strongly Disagree	Disagree Somewhat	Disagree Slightly	Agree Slightly	Agree Somewhat	Strongly Agree
1	2	3	4	5	6

19.	It's difficult for me to voice my own opinions on controversial matters.	1	2	3	4	5	6
20.	My daily life is busy, but I derive a sense of satisfaction from keeping up with everything.	1	2	3	4	5	6
21.	I often change my mind about decisions if my friends or family disagree.	1	2	3	4	5	6
22.	I get frustrated when trying to plan my daily activities because I never accomplish the things I set out to do.	1	2	3	4	5	6
23.	I am not the kind of person who gives in to social pressures to think or act in certain ways.	1	2	3	4	5	6
24.	My efforts to find the kinds of activities and relationships that I need have been quite successful.	1	2	3	4	5	6
25.	I am concerned about how other people evaluate the choices I have made in my life.	1	2	3	4	5	6
26.	I have difficulty arranging my life in a way that is satisfying to me.	1	2	3	4	5	6
27.	I judge myself by what I think is important, not by the values of what others think is important.	1	2	3	4	5	6
28.	I have been able to build a home and a lifestyle for myself that is much to my liking.	1	2	3	4	5	6

APPENDIX H: DEMOGRAPHIC QUESTIONNAIRE

Note: All information that you provide will be kept strictly CONFIDENTIAL and in no way will your name or identity be associated with the data you provide.

Please answer the following questions about yourself.

1. Gender: ___M ____F ____Other (check one)

2. Age: _____

3. Race/Ethnicity:

_____ Asian
_____ Native Hawaiian/Pacific Islander
_____ Black/ African-American
_____ White/Caucasian
_____ Hispanic/Latino(a)
_____ Native American/Alaska Native
_____ Other race/ethnicity (Please specify:_____)

4. Current year in college: _____1st _____2nd _____3rd _____4th_____5th_____6th

5. Total years of eligibility:_____ Total years of eligibility left:_____

6. Are you on an athletic scholarship? _____Yes _____ No

7. While engaging in competition, do you compete as an individual (1 against 1 or alone on a course/field) or with a team ? (i.e., golf is considered an individual sport while volleyball is considered a team sport.)

_____	Individual
_____	Team

8. Do you primarily play as a starter or a substitute for your sport's team?

_____	Starter
_____	Substitute

9. How old were you when you first played competitively in your primary sport? _____

10. Do you find performance pressure helpful or unhelpful to your play in competition?
_____ Helpful
_____ Unhelpful
_____Both (it depends)

11. Have you ever lost as a result of performance pressure?
_____Yes
_____ No

11a. If yes, would you consider your loss a result of "choking under pressure?"
_____Yes
_____ No

11b. If yes, how problematic has performance pressure or "choking under pressure" been for you in competition?

Not Very Problematic				Extremely Problematic
1	2	3	4	5

11c. If yes, please indicate how much pressure you feel from the following:

Pressure from Self				
None	A Little	Some	Much	A Great Deal
1	2	3	4	5

Explain your answer:
_____
_____

Pressure from Coach				
None	A Little	Some	Much	A Great Deal
1	2	3	4	5

Explain your answer:
_____
_____

Pressure from Team/Teammates				
None	A Little	Some	Much	A Great Deal
1	2	3	4	5

Explain your answer:
_____
_____

Pressure from Family				
None	A Little	Some	Much	A Great Deal
1	2	3	4	5

Explain your answer:

_____

_____

11d. If yes, how many times have you allowed performance pressure to affect you in competition? Please mark the one that best describes you:

_____ A few times in my life
_____ About once a season
_____ Several times a season
_____ Almost every time I compete

11e. If yes, did this affect how you felt about yourself as an athlete?

_____ No
_____ Yes (short-term effect)
_____ Yes (long-term effect)

11f. If yes, did this affect your status on the team (i.e., loss of playing time, loss of priority, etc.)

_____ No
_____ Yes (short-term effect)
_____ Yes (long-term effect)

11g. If yes, in what situations do you experience performance pressure most often (i.e., big shots, closing out a point, against stronger players/teams, against your own records, etc.)?

Explain your answer:

_____

_____

_____

REFERENCES

Anshel, M. H. (1996). Coping styles among adolescent competitive athletes. *Journal of Social Psychology, 136,* 311-324.

Anshel, M. H., & Kaissidis, A. N. (1997). Coping style and situational appraisals as predictors of coping strategies following stressful events in sport as a function of gender and skill level. *British Journal of Psychology, 88,* 263-276.

Anshel, M. H., Jamieson, J., & Raviv, S. (2001). Cognitive appraisals and coping strategies following acute stress among skilled competitive male and female athletes. *Journal of Sport Behavior, 24,* 128-134.

Anshel, M. H., & Weinberg, R. S. (1999). Re-examining coping among basketball referees following stressful events: Implications for coping interventions. *Journal of Sport Behavior, 22,* 141-161.

Araas, T.E. (2008). Associations of mindfulness, perceived stress, and health behaviors in college freshmen. *Dissertation Abstracts International Section A: Humanities and Social Sciences*, *69* (2-A), 521.

Baer, R.A., Smith, G.T., & Allen, K.B. (2004). Assessment of mindfulness by self-report: The Kentucky inventory of mindfulness skills. *Assessment*, *11*, 191-206.

Baer, R.A., Smith, G.T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*, 27-45.

Baillie, P. H. F., & Ogilvie, B.C. (2002). Working with elite athletes. In Van Raalte, J.L. & B.W. Brewer (Eds.), *Exploring sport and exercise psychology* (2nd ed.) (pp. 395-415). Washington, DC: American Psychological Association.

Baumeister, R.F. (1984). Choking under pressure: Self-consciousness and paradoxical effects of incentives on skillful performance. *Journal of Personality and Social Psychology, 46,* 610-620.

Baumeister, R.F., & Showers, C.J. (1986). A review of paradoxical performance effects: Choking under pressure in sports and mental tests. *European Journal of Social Psychology*, *16*, 361-383.

Baumeister, R.F., & Steinhilber, A. (1984). Paradoxical effects of supportive audiences on performance under pressure: The home field disadvantage in sports championships. *Journal of Personality and Social Psychology, 47,* 85-93.

Beilock, S. L. (2007). Choking under pressure. In R. Baumeister and K. Vohs (Eds.), *Encyclopedia of social psychology* (pp.140-141). Sage Publications.

Beilock, S. L. (2008). Beyond the playing field: Sports psychology meets embodied cognition. *International Review of Sport and Exercise Psychology*, *1*, 19-30.

Beilock, S. L., Bertenthal, B.I., McCoy, A.M., & Carr, T.H. (2004). Haste does not always make waste: Expertise, direction of attention, and speed versus accuracy in performing sensorimotor skills. *Psychonomic Bulletin and Review*, *11*, 373-379.

Beilock, S. L., & Carr, T.H. (2001). On the fragility of skilled performance: What governs choking under pressure? *Journal of Experimental Psychology: General, 130,* 701-725.

Beilock, S.L., & Carr, T.H. (2005). When high-powered people fail: Working memory and ''choking under pressure'' in math. *Psychological Science, 16,* 101-105.

Beilock, S. L., Carr, T. H., MacMahon, C., & Starkes, J. L. (2002). When paying attention becomes counterproductive: Impact of divided versus skill-focused attention on novice and experienced performance of sensorimotor skills. *Journal of Experimental Psychology: Applied, 8,* 6-16.

Beilock, S. L., & Gonso, S. (2008). Putting in the mind vs. putting on the green: Expertise, performance time, and the linking of imagery and action. *The Quarterly Journal of Experimental Psychology: Human Experimental Psychology, 61,* 920-932.

Beilock, S.L., & Gray, R. (2007). Why do athletes choke under pressure? In R.C. Eklund & G. Tenenbaum (Eds.), *Handbook of sports psychology* (pp. 425-444). Newark: John Wiley & Sons, Inc.

Beilock, S. L., Lyons, I. M., Mattarella-Micke, A., Nusbaum, H. C., & Small, S. L. (2008). Sports experience changes the neural processing of action language. *Proceedings of the National Academy of Sciences*, *USA*, *105*, 13269-13273.

Beilock, S. L. & McConnell, A. R. (2004). Stereotype threat and sport: Can athletic performance be threatened? *Journal of Sport and Exercise Psychology*, *26*, 597-609.

Biddle, S.J., Fox, K.R., Boutcher, S.H., & Faulkner, G.E. (2000). The way forward for physical activity and the promotion of psychological well-being. In S.J.H. Biddle, K.R. Fox, & S.H. Boutcher (Eds.), *Physical activity and psychological well-being* (pp. 3-28). London: Routledge.

Bishop, S.R., Lau, M., Shapiro, S., Carlson, L., Anderson, N.D., & Carmody, J. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice, 11*, 230-241.

Bodner, T., & Langer, E. (2001). *Individual differences in mindfulness: The Langer Mindfulness Scale*. Poster session presented at the annual meeting of the American Psychological Society, Toronto, Ont., Canada.

Bond, C. F., Jr. (1982). Social facilitation: A self-presentational view. *Journal of Personality and Social Psychology, 42,* 1042-1050.

Bond, C. F., Jr. (1986). Winning isn't everything…nor is it the only thing. *Sport Coach, 10,* 34-36.

Borkovec, T.D., & Costello (1993). Efficacy of applied relaxation and cognitive-behavioral therapy in the treatment of generalized anxiety disorder. J*ournal of Consulting and Clinical Psychology, 61*, 611-619.

Brace, N., Kemp, R., & Snelgar, R. (2006). *SPSS for Psychologists: A guide to data analysis using SPSS for widows* (3rd ed.). London: Palgrave Macmillan.

Brown, K., & Ryan, R. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822-848.

Brown, K., Ryan, R., & Creswell, J. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry*, *18*, 211-237.

Butler, J. L., & Baumeister, R. F. (1998). The trouble with friendly faces: Skilled performance with a supportive audience. *Journal of Personality and Social Psychology, 75,* 1213-1230.

Calvo, M.G., Alamo, L., & Ramos, P.M. (1990). Test anxiety, motor performance and learning: Attentional and somatic interference. P*ersonality and Individual Differences, 11,* 29-38.

Calvo, M.G., Eysenck, M.W., & Castillo, M.D. (1997). Interpretation bias in test anxiety: The time course of predictive inferences. *Cognitive and Emotion, 11,* 43-63.

Carmody, J., & Baer, R.A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine, 31*, 23-33.

Carson, S.H., & Langer, E.J. (2006). Mindfulness and self-acceptance. *Journal of Rational-Emotive & Cognitive Behavior Therapy, 24*, 29-43.

Carver, C. S. (1979). A cybernetic model of self-attention processes. *Journal of Personality and Social Psychology, 37,* 1251-1281.

Carver, C. S., Antoni, M., & Scheier, M. F. (1985). Self-consciousness and self-assessment. *Journal of Personality and Social Psychology, 48,* 117-124.

Carver, C. S., & Scheier, M. F. (1981). *Attention and self-regulation.* New York: Springer-Verlag.

Chatzisarantis, N.L.D., & Hagger, M.S. (2007). The moral worth of sport reconsidered: Contributions of recreational sport and competitive sport to life aspirations and psychological well-being. *Journal of Sports Sciences, 25*, 1047-1056.

Cheek, J., & Briggs, S.R. (1982). Self-consciousness and aspects of identity. *Journal of Research in Personality, 16,* 401-408.

Coffey, K., & Hartman, M. (2008). Mechanisms of action in the inverse relationship between mindfulness and psychological distress. *Complementary Health Practice Review, 13*, 79-91.

Creswell, J.D., Way, B.M., Eisenberger, N. I., & Lieberman, M.D. (2007). Neural correlates of dispositional mindfulness during affect labeling. *Psychosomatic Medicine, 69*, 560-565.

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: HarperCollins.

Diagnostic and statistical manual of mental disorders (DSM-IV). (1994). Washington, D.C.: American Psychiatric Association

DiBartolo, P.M., & Shaffer, C. (2002). A comparison of female college athletes and nonathletes: Eating disorder symptomatology and psychological well-being. *Journal of Sport & Exercise Psychology, 24*, 33-41.

Diener, E., & Lucas, R. E. (1999). Personality and subjective well-being. In D. Kahneman, E. Diener, & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 213-229). New York: Russell Sage Foundation.

Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin, 125,* 276-302.

Duda, J. L. (2001). Goal perspectives and their implications for health related outcomes in the physical domain. In F. Cury, P. Sarrazin, & F. P. Famose (Eds.), *Advances in motivation theories in the sport domain*. Paris: Presses Universitaires de France.

Duval, S., & Wicklund, R.A. (1972). *A theory of objective self-awareness*. New York: Academic Press.

Faul, F., Erdfelder, E., Lang, A., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175-191.

Fava, G. A., Rafanelli, C., Grandi, S., Conti, S., & Belluardo, P. (1998). Prevention of recurrent depression with cognitive behavioral therapy. *Archives of General Psychiatry, 56,* 479-480.

Fenigstein, A. (1979). Self-consciousness, self-attention, and social interaction. *Journal of Personality and Social Psychology, 37,* 75-86.

Fenigstein, A., Scheier, M.F., & Buss, A.H. (1975). Public and private self-consciousness: Assessment and theory. *Journal of Consulting and Clinical Psychology, 43,* 522-527.

Fitts, P. M., Bahrick, H. P., Noble, M. E. and Briggs, G. E. (1961). *Skilled performance*, New York: John Wiley.

Folkman, S., & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior, 21,* 219-239.

Folkman, S., & Lazarus, R. S. (1988). Coping as a mediator of emotion. *Journal of Personality and Social Psychology, 54,* 466-475.

Freud, S. (1922). *Introductory lectures on psychoanalysis.* London: George Allen & Unwin.

Gardner, F. L., & Moore, Z. E. (2004). A Mindfulness–Acceptance–Commitment (MAC) based approach to performance enhancement: Theoretical considerations. *Behavior Therapy, 35*, 707-723.

Gardner, F. L., & Moore, Z. E. (2007). *The psychology of enhancing human performance: The mindfulness-acceptance-commitment (MAC) approach*. New York: Springer.

Goorjian, B. (2002, April 14). Titans choke tag cuts deep. *Sunday Herald Sun*, p. 28.

Gosling, S.D., Vazire, S., Srivasta, S. & John, O.P. (2004). Should we trust web-based studies?: A comparative analysis of six preconceptions about Internet questionnaires. *American Psychologist, 59*, 93-104.

Gould, D., Jackson, S. A., & Finch, L. (1993). Sources of stress in national champion figure skaters. *Journal of Sport and Exercise Psychology, 15,* 134-159.

Gray, R. (2004). Attending to the execution of a complex sensorimotor skill: Expertise differences, choking, and slumps. *Journal of Experimental Psychology: Applied, 10,* 42-54.

Grossman, (2008). Is the glass half empty or half full?: Genetically determined disease in frontotemporal dementia. *Neurology, 71*, 1216-1217.

Gucciardi, D.F., Longbottom, J.L., Jackson, B., & Dimmock, J.A. (2010). Experienced golfers' perspectives on choking under pressure. *Journal of Sport and Exercise Psychology*, *32*, 61-83.

Hagger, M. S., & Chatzisarantis, N. L. D. (2005). First- and higher-order models of attitudes, normative influence, and perceived behavioural control in the theory of planned behaviour. *British Journal of Social Psychology*, *44*, 513-535.

Halvari, H., & Gjesme, T. (1995). Trait and state anxiety before and after competitive performance. *Perceptual and Motor Skills, 81,* 1059-1074.

Hardy, L., Mullen, R., & Jones, G. (1996). Knowledge and conscious control of motor actions under stress. *British Journal of Psychology, 87,* 621-636.

Hays, K.F. (1999). *Working it out: Using exercise in psychotherapy*. Washington, DC: American Psychological Association.

Heaton, A.W., & Sigall, H. (1991). Self-consciousness, self-presentation, and performance under pressure: Who chokes, and when? *Journal of Applied Social Psychology, 21,* 175-188.

Hill, D., Hanton, S., Fleming, S., & Matthews, N. (2009). A re-examination of choking in sport. European Journal of Sports Science, 9, 203-212.

Hill, K. L. (2001). Frameworks for sport psychologists: Enhancing sport performance. Champaign, IL: Human Kinetics.

Hopko, D.R., Hunt, M.K., & Armento, M.E.A. (2005). Attentional task aptitude and performance anxiety. *International Journal of Stress Management, 12,* 389-408.

Hopko, D.R., McNeil, D.W., Zvolensky, M.J., & Eifert, G.H. (2001). The relation between anxiety and skill in performance-based anxiety disorders: A behavioral formulation of social phobia. *Behavior Therapy, 32,* 185-207.

Hull, J.G., Reilly, N.P., & Ennis, C. (1990). Self-consciousness, role discrepancy, and depressive affect. *Anxiety Research, 2,* 197-210.

Hull, J.G., & Young, R.D. (1983). Self-consciousness, self-esteem, success-failure as determinants of alcohol consumption. *Journal of Personality and Social Psychology, 44,* 1097-1107.

Huynh, T. V., Gotay, C., Layi, G., Garrard, S. (2007). Mindfulness meditation and its medical and non-medical applications. *Hawaii Medical Journal*, *66*, 328-330.

Jackson, P., & Delehanty, H. (1995). *Sacred hoops: Spiritual lessons of a hardwood warrior*. New York: Hyperion.

Jackson, R., & Beilock, S.L. (2008). Attention and performance. In D. Farrow, J. Baker, and C. MacMahon (Eds.), *Developing elite sports performers: Lessons from theory and practice* (pp. 104-118). Routledge.

Jackson, R.C., Ashford, K.J., Norsworthy, G. (2006). Attentional focus, dispositional reinvestment, and skilled motor performance under pressure. *Journal of Sport & Exercise Psychology*, *28*, 49-68.

Jackson, S. A., & Csikszentmihalyi, M. C. (1999). *Flow in sports: The keys to optimal experiences and performances*. Champaign, IL: Human Kinetics.

Jordet, G. (2009). When superstars flop: Public status and choking under pressure in international soccer penalty shootouts. *Journal of Applied Sport Psychology*, *21*, 125-130.

Juhi, B. (2007, July 29). *Gunfire erupts after Iraq soccer win*. Retrieved January 12, 2008 from http://abcnews.go.com/International/wireStory?id=3425818.

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness.* New York: Delacorte.

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice, 10*, 144-156.

Kabat-Zinn, J. (2005). *Coming to our senses*. New York: Hyperion.

Kahneman, D. (1973). *Attention and effort*. Englewood Cliffs, NJ: Prentice-Hall Styles, E.A.

Kee, Y.H., & Wang, C.K. J. (2007). Relationships between mindfulness, flow dispositions and mental skills adoption: A cluster analytic approach. *Psychology of Sport and Exercise, 9*, 393-411.

Keele, S. (1973). *Attention and human performance*. Pacific Palisades, CA: Goodyear

Keyes, C. L. M., Shmotkin, D., & Ryff, C.D. (2002). Optimizing well-being: The empirical encounter of two traditions. *Journal of Personality and Social Psychology, 82*, 1007-1022.

Krane, V., Greenleaf, C.A., & Snow, J. (1997). Reaching for gold and the price of glory: A motivation case study of an elite gymnast. *The Sport Psychologist*, *11*, 53-71.

Kubovy, M. (1999). On the pleasures of the mind. In Kahneman, D., Diener, E., & Schwarz, N. (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 134-154). New York: Russell Sage Foundation.

Kurosawa, K., & Harackiewicz, J. M (1995). Test anxiety, self-awareness, and cognitive interference: A process analysis. *Journal of Personality, 63,* 932-951.

Lakey, C.E., Campbell, W. K., Brown, K.W., & Goodie, A.S. (2007). Dispositional mindfulness as a predictor of the severity of gambling outcomes. *Personality and Individual Differences, 43*, 1698-1710.

Langer, E. J., & Imber, L. G. (1979). When practice makes imperfect: Debilitating effects of overlearning. *Journal of Personality and Social Psychology, 37,* 2014-2024.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping*. New York: Springer.

Leary, M. R (1992). Self-presentational processes in exercise and sport. *Journal of Sport and Exercise Psychology, 14,* 339-351.

Leary, M. R., & Kowalski, R. M. (1990). Impression management: A literature review and two-component model. *Psychological Bulletin, 107,* 34-47.

LeBel, J. L., & Dube´, L. (2001, June). *The impact of sensory knowledge and attentional focus on pleasure and on behavioral responses to hedonic stimuli.* Paper presented at the 13th annual American Psychological Society Convention, Toronto, Ontario, Canada.

Leffingwell, T. R., Wiechman, S. A., Smith, R. A., Smoll, F. L., & Christensen, D. S. (2001). Sport psychology training within a clinical psychology program and a department of intercollegiate athletics. *Professional Psychology: Research and Practice, 32,* 531-536.

Lewis, B.P., & Linder, D.E. (1997). Thinking about choking? Attentional processes and paradoxical performance. *Personality and Social Psychology Bulletin, 23,* 937-944.

Liu, F. L., & Yang, H. Y. (2002). A comparative study of the psychological well-being of student athletes and common students in institutes of higher education. *Journal of Wuhan Institute of Physical Education, 36*, 119-121.

Malebo, A., van Eeden, C., & Wissing, M.P. (2007). Sport participation, psychological well-being, and psychosocial development in a group of young black adults. *South African Journal of Psychology, 37*, 188-206.

Mandler, G., & Sarason, S.B. (1952). A study of anxiety and learning. *Journal of Abnormal and Social Psychology, 47,* 166-173.

Markman, A.B., Maddox, W.T., & Worthy, D.A. (2006). Choking and excelling under pressure. *Psychological Science, 17*, 944-948.

Martin, J.P. (1997). Mindfulness: A proposed common factor. *Journal of Psychotherapy Integration, 7*, 291-312.

Masicampo, E.J, & Baumeister, R.F. (2007). Relating mindfulness and self-regulatory processes. *Psychological Inquiry*, *18*, 255-258.

Masters, R. S. W. (1992). Knowledge, knerves and know-how: The role of explicit versus implicit knowledge in the breakdown of a complex motor skill under pressure. *British Journal of Psychology, 83,* 343-358.

Masters, R.S.W., Polman, R.C.J., & Hammond, N.V. (1993). "Reinvestment": A dimension of personality implicated in skill breakdown under pressure. *Personality and Individual Differences, 14,* 655-666.

McCracken, L.M., Gauntlet-Gilbert, J., & Vowles, K.E. (2007). The role of mindfulness in a contextual cognitive-behavioral analysis of chronic pain-related suffering and disability. *Pain, 131*, 63-69.

McGregor, I., & Little, B. R. (1998). Personal projects, happiness, and meaning: On doing well and being yourself. *Journal of Personality and Social Psychology, 74,* 494-512.

McKay, M., Wood, J.C., & Brantley, J. (2007). *Dialectical behavior therapy workbook: Practical DBT exercises for learning mindfulness, interpersonal effectiveness, emotion regulation, and distress tolerance*. Oakland: New Harbinger.

McKinley, N. M. (1999). Women and objectified body consciousness: Mothers' and daughters' body experience in cultural, development, and familial context. *Developmental Psychology, 35,* 760-769.

Mesagno, C. (2006). Investigating the use of choking intervention strategies with choking-susceptible athletes (Doctoral dissertation, Victoria University, 2006). Retrievedfrom:http://wallaby.vu.edu.au/adtVVUT/uploads/approved/adtVVUT20060919.154647/ public/01front.pdf.

Mesagno, C., Marchant, D., & Morris, T. (2008). A pre-performance routine to alleviate choking in "choking-susceptible" athletes. *The Sport Psychologist*, *22*, 439-457.

Mesagno, C., Marchant, D., & Morris, T. (2009). Alleviating choking: The sounds of distraction. *Journal of Applied Sport Psychology*, *21*, 131-147.

Miles, J., & Shevlin, M. (2007). *Applying regression & correlation: A guide for students and researchers.* Thousand Oaks, CA: Sage.

Mobbs, D., Hassabis, D., Seymour, B., Marchant, J.L., Weiskopf, N., Dolan, R.J., & Frith, C.D. (2009). Choking on the money: Reward-based performance decrements are associated with midbrain activity. *Psychological Science*, *20*, 955-962.

Mullen, B., & Suls, J. (1982). The effectiveness of attention and rejection as coping styles: A meta-analysis of temporal differences. *Journal of Psychosomatic Research, 26,* 43-49.

Murphy, B.L., Arnsten, A. F. T., Goldman-Rakic, P.S., & Roth, R.H. (1996). Increased dopamine turnover in the prefrontal cortex impairs spatial working memory performance in rats and monkeys. *Proceedings of the National Academy of Sciences*, *USA*, *93*, 1325-1329.

Murray, N.M., & Janelle, C.M. (2003). Anxiety and performance: A visual search examination of the processing efficiency theory. *Journal of Sport and Exercise Psychology*, *25,* 171-187.

Nideffer, R. M. (1992). *Psyched to win*. Champaign IL: Leisure Press.

Nideffer, R. M., & Sagal, M. S. (1998). Concentration and attention control training. In J. M. Williams (Ed.), *Applied sport psychology: Personal growth to peak performance* (3rd ed.) (pp. 296-315). Mountain View, CA: Mayfield.

Orlick, T. (1990). *In pursuit of excellence*. Champaign, IL: Leisure Press.

Oudejans, R.R.D, & Pijpers, J.R. (2010). Training with mild anxiety may prevent choking under higher levels of anxiety. *Psychology of Sport and Exercise*, *11*, 44-50.

Pipe, A. (2001). The adverse effects of elite competition on health and well-being. *Canadian Journal of Applied Physiology, 26 (Suppl.),* S192-S201.

Powell, D.H. (2004). Treating individuals with debilitating performance anxiety: An introduction. *Journal of Clinical Psychology: In Session*, *60*, 801-808.

Ravizza, K. (2002). A philosophical construct: A framework for performance enhancement. *International Journal of Sport Psychology, 33*, 4-18.

Rawstorne, P., Anshel, M.H., & Caputi, P. (2000). Toward evidence of individual differences in coping with acute stress in sport. *Australian Journal of Psychology*, *13,* 1-8.

Reinboth, M., & Duda, J. L. (2004). The motivational climate, perceived ability, and athletes' psychological and physical well-being. *The Sport Psychologist*, *18*, 237-251.

Reinboth, M., & Duda, J. L. (2006). Perceived motivational climate, need satisfaction and indices of well-being in team sports: A longitudinal perspective. *Psychology of Sport and Exercise, 7*, 269-286.

Roth, S., & Cohen, L. J. (1986). Approach, avoidance, and coping with stress. *American Psychologist, 41,* 813-819.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation social development, and well-being. *American Psychologist, 55*, 68-78.

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52,* 141-166.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57,* 1069-1081.

Ryff, C.D. (1995). Psychological well-being in adult life. *Psychological Science*, *4*, 99-104.

Ryff, C.D. & Keyes, C.L.M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology, 69*, 719-727.

Sarrazin, P., Guillet, E., & Cury, F. (2001). The effect of coach's task and ego-involving climate on the changes of perceived competence relatedness, and autonomy among girl handballers. *European Journal of Sport Science, 1*, 1-9.

Segal, Z. V., Williams, J. M., & Teasdale, J.D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse.* New York: Guilford.

Shaffer, S.M., & Weise-Bjornstal, D.M. (1999). Psychological intervention strategies in sports medicine. In R. Ray & D. M. Wiese-Bjornstal (Eds.), *Counseling in sports medicine* (pp. 41-54). Champaign, IL: Human Kinetics.

Shapiro, S. L., Carlson L. E., Astin J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 62*, 373-386.

Shapiro, S. L., Oman, D., Thoresen, C. E., Plante, T.G., & Flinders, T. (2008). Cultivating mindfulness: Effects on well-being. *Journal of Clinical Psychology*, *64*, 840-862.

Simon, M. K. (2006). *Dissertation and scholarly research: A practical guide to start and complete your dissertation, thesis, or formal research project*. Dubuque, IA: Kendall/Hunt.

Singer, R. N. (1986). *Peak performance… and more.* New York: Mouvement.

Singer, R.N. (2000). Performance and human factors: Considerations about cognition and attention for self-paced and externally-paced events. *Ergonomics, 43,* 1661-1680.

Smith, R.E., Smoll, F.L., Cumming, S.P., & Grossbard, J.R. (2006). Measurement of multidimensional sport performance anxiety in children and adults: The sport anxiety scale-2. *Journal of Sport and Exercise Psychology, 28,* 479-501.

Spence, J.T., & Spence, K.W. (1966). The motivational components of manifest anxiety: Drive and drive stimuli. In C.D. Spielberger (Ed.), *Anxiety and behavior* (pp. 291-326). New York: Academic Press.

Spielberger, C.D., (1966). Theory and research on anxiety. In C.D. Spielberger (Ed.), *Anxiety and behavior* (pp. 34-78). New York: Academic Press.

Spielberger, C.D., Anton, W.D., & Bendel, J. (1976). The nature and treatment of test anxiety. In C.D. Zuckerman & C.D. Spielberger (Eds.), Emotions and anxiety: New concepts, methods, and applications (pp. 317-345). New York: Erlbaum.

Stainback, R.D., Moncier, J.C., & Taylor, R.E. (2007). Sport psychology: A clinician's perspective. In R.C. Eklund & G. Tenenbaum (Eds.), *Handbook of sports psychology* (pp.310-330). Newark: John Wiley & Sons, Inc.

Statnotes, (2010). *Multiple regression*. Retrieved on March 14, 2010 from http://faculty.chass.ncsu.edu/garson/PA765/regress.htm.

StatSoft, Inc.(2010). *Electronic Statistics Textbook*. Tulsa, OK: StatSoft. WEB: http://www.statsoft.com/textbook/.

Styles, E. (1997). *The psychology of attention.* East Sussex, England: Taylor & Francis.

Takahashi, T., Murata, T., Hamada, T., Omori, M., Kosaka, H., Kikuchi, M., Yoshida, H., & Wada, Y. (2005). Changes in EEG and autonomic nervous activity during meditation and their association with personality traits. *International Journal of Psychophysiology*, *55*, 199-207.

Tabachnick, B. G., and Fidell, L. S. (2007). *Using Multivariate Statistics, 5th ed.* Boston: Allyn and Bacon.

Wang, J. (2002). *Developing and testing an integrated model of choking in sport* (Doctoral dissertation, Victoria University, 2002). Retrieved on October 15, 2008 from http://eprints.vu.edu.au/archive/00000230/01/02whole.pdf

Wang, J., Callahan, D., & Goldfine, B. (2003). Choking under pressure in competition and psychological intervention approaches. *Strength and Conditioning Journal*, *25*, 69-75.

Wang, J., Marchant, D., Morris, T. (2004). Coping style and susceptibility to choking. *Journal of Sport Behavior*, *27*, 75-92.

Wang, J., Marchant, D., Morris, T., & Gibbs, P. (2004). Self-consciousness and trait anxiety as predictors of choking in sport. *Journal of Science and Medicine in Sport*, *7*, 174-185.

Waterman, A. S. (1993). Two conceptions of happiness: Contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment. *Journal of Personality and Social Psychology, 64,* 678-691.

Weinberg, R. S. (1988). *The mental advantage: Developing your psychological skills in tennis.* Champaign, IL: Human Kinetics.

Williams, J. M., & Harris, D. V. (1998). Relaxation and energizing techniques for regulation of arousal. In J.M. Williams (Ed.), *Applied sport psychology* (pp. 219-236). Mountain View, CA: Mayfield.

Williams, J. M., & Krane, V. (1992). Coping styles and self-reported measures of state anxiety and self-confidence. *Journal of Applied Sport Psychology, 4,* 134-143.

Wine, J. (1971). Test anxiety and direction of attention. *Psychological Bulletin, 76,* 92-104.

Wine, J. D. (1980). Cognitive-attentional theory of test anxiety. In I. G. Sarason (Ed.), *Test anxiety: Theory, research, and applications* (pp. 349-385). Hillsdale, NJ: Erlbaum.

Wong, E., Lox, C., & Clark, S. (1993). Relation between sports context, competitive trait anxiety, perceived ability, and self-presentation confidence. *Perceptual and Motor Skills, 76,* 847-850.

Woody, S.R. (1996). Effects of focus of attention on anxiety levels and social performance of individuals with social phobia. *Journal of Abnormal Psychology, 105,* 61-69.

Yerkes, R.M., & Dodson, J.D. (1908). The relationship of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology of Psychology, 18,* 459-482.

VITA

Lauren Therese Melendres was born and raised in Santa Fe, New Mexico. She completed her degree at Santa Fe High School in 1998, and then entered Stanford University in Palo Alto, California. She earned her degree of Bachelor of Arts in Psychology from Stanford University in 2002. After college, she continued her studies at Stanford University, where she completed her Masters of Arts degree in Psychology in 2003. She lived and worked in Palo Alto prior to entering the Counseling Psychology Doctoral Program at the University of Texas at Austin in the fall of 2005. She will complete her predoctoral clinical internship in August 2011 at the James J. Peters VA Medical Center in New York.

Permanent address: 15 East 21st Street, Apartment 510, New York, NY 10010

This dissertation was typed by the author.